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On the Ship Worm and the Means of Preventing its Ravages.

A Paper read before the Polytechnic Club of the American Institute on the 27th of January, 1871, by Dr. ADOLPH OTT

THE extensive destruction of submarine works caused by the teredo navalis or ship worm, prompted the Royal Academy of Sciences in Amsterdam, in the year 1858, to appoint a committee to investigate the natural history of this singular animal, and the remedies proposed for preventing its attacks. The results of these investigations, of which we shall only present the most important ones, have now been published by E. K. VON BUMHAUER, in the "Mededeelingen d. k. Acad. v. Wetensch."

The mode in which the boring mollusks—for there are several of them—perforate all bodies, from the softest wood to the hardest stone, has been the subject of various opinions; yet, it is now generally considered by naturalists, that the rock-boring mollusks are capable of secreting a liquid which corrodes stone, while others, like pholas and teredo, bore by physical action.

As to the teredo navalis or ship worm, it belongs to the acephalous or headless mollusks, the same zöological division as the oyster. It is enveloped by a shell and mantle, which form a sort of sheath communicating by two syphons with the exterior. The shell itself consists of two valves of equal size, which are united by a fold of the mantle in such a manner as to permit of only very slight movements. The surface of the shell, upon examination with a magnifying glass, presents a striated and indented appearance, especially towards the margins. (The wedge-like teeth present a length of 1.65 lines.) These striations are not uniformly distributed over the shell, but upon the anterior, thicker and spoon-like part, they run nearly in a straight angle towards those of the centre. It is estimated that both valves together bear 20,000 teeth. We will remark that as long as the animal grows, new and sharper teeth are constantly formed, which substitute the older and blunt ones.

The fecundation takes place by the contact of the syphon with that of an individual of the other sex. The females, of which there are about twenty to one male, lay eggs. These are expelled in June through the syphon, and on the fourth day are already transformed into larvæ, which are capable of attacking wood. M. KATER has seen them at the end of June in large masses upon wood, and on the 15th of July he discovered grown up mollusks in its interior.

The teredo bores at first a very small aperture in a direction perpendicular to the surface, but it changes its route after a while, in order to follow the direction of the fibres. In the first stage of its development, this imperceptible but none the less dangerous miner has only one syphon, but later another is formed. They are of unequal lengths. Both seem to serve for secreting the fæces, which mostly consist of pulverized particles of wood, forming a very fine white mass. It seems that the shorter syphon is principally used for this purpose, while the longer ones serve for the reception of food, consisting of infusoria, diatomes and other lower organisms. The boreworm requires pure, clear water, with a certain amount of salt. If the sea water is mingled with much fresh water, the animal dies.

It continues to grow in the wood. At first the diameter of the groove is only half a millimetre, but gradually reaches five millimetres and more. The teredo itself acquires a length of from one foot to one foot four inches. It usually attacks that portion of the wood lying between low and high water marks, and if it is sometimes found above the water, it is because the timber has retained a sufficient degree of moisture. At Ostend, where the teredo abounds, it has been found in all situations below 6 feet 3 inches (1.90 met.) above the low-water mark of spring tides.

In its abode, the margin of the mantle secretes calcareous matter and deposits it on the inner wall of the cell. This deposit is at first quite soft, but soon becomes hard. Between this calcareous layer and the animal, there is, however, left sufficient space, so as not to hinder the little miner in its movements. Strange it is, but however multiplied may be their tubes in the same piece of wood, they never mingle, so that between two tubes, there is always left a partition wall, though sometimes a very thin one. "The wood," says LOUIS FIGUIER in his admirable book (The Ocean World), "is thus attacked at a thousand diverse points, until it is invaded and its entire substance destroyed. Submarine constructions upon which bridges are built are often riddled and perforated. They appear to all outward examination as solid and perfect as at the moment they were first erected; but they yield to the least force, bringing ruin and destruction on the edifices they support. Ships have thus been silently and secretly mined, until the planks crumbled into dust under the feet of the sailors. Others have gone down with their crews, owing to the ravages of these relentless enemies, which are horrible from their unapproachable littleness."

If removed from the salt water, the teredo dies within twenty-four hours, while if taken out of the wood, it continues to live in sea water for three or four days. Its abode in the ligneous tissue is therefore a condition of life. In a worm belonging to the annelidæ (lycaris fucata), which is always found in the wood excavated by the toredo, we find an enemy of the latter. This parasite attaches itself to the entrance of the tube, sucks itself to the teredo and devours it slowly. It then seeks another victim. It has a length of from four to six inches, and is provided on both sides with numerous hairy feet. Behind the head, which is provided with a powerful masticatory apparatus, there are four pairs of tubular appendages.

Formerly, it was supposed that the naval worm was a native of the tropical zones, but the discovery of closely related species in the tertiary layers and various discoveries of excavated pieces of timber in more recent deposits have proved the fallacy of that supposition.

The circumstance that the teredo appeared in enormous hosts in the years 1731, 1770, 1827, 1858 and 1859, has also led to the discovery that an unusually large increase takes place whenever by lack of rain the rivers run low, thus augmenting the proportion of salt in the sea near the coasts.

For a long time past, various means have been proposed in order to preserve timber used for marine purposes from the attacks of the teredo. To gain an insight into the efficiency of these alleged remedies, the Academy of Sciences of Amsterdam instituted a series of experiments, which were conducted by Messrs. W. VROLIK, P. HARTING, D. STORM-BRIEGSING, S. W. L. von Oordt, and E. H. VON BAUMHAUER.

In reporting these experiments, the author, Mr. E. H. VON BAUMHAUER calls attention to the fact, that upon the great devastations caused by the teredo in 1858 and 1859, a number of secret remedies were offered to the government. The scientific committee had considered it its duty not to leave any one of them untried, although there were many among them which it could be foreseen would be inefficient. And in order that no objections could be made upon the part of the members, they were allowed to conduct the trials themselves.

The experiments were made in the harbors of Kissingen, Harlingen, Stavoren and Niervendam, with piles of oak, pine and fir, some of which were prepared and others left in a natural condition, so as to serve as counter-proofs. The piles were mostly three and a third feet long and of a cross-section of two to three square feet. Three classes of experiments were made—

1. The external coating, with paints and other substances.
2. The impregnation of the wood with substances by which the appearance of the surface as well as that of the interior is changed.
3. The use of very dense exotic wood.

In experiments of the first class, the following compositions were tried:

(1.) A composition of CLASSEN, kept secret.

(2.) A metallic paint of CLASSEN, also kept secret.

(3.) A composition of BRINKERINK, consisting of Russian tallow, coal tar, rosin, sulphur and powdered glass, applied warm and after the wood had been roughed. The layer was several lines thick.

(4.) A composition of RIJHWYK, somewhat similar to No. 3.

(5.) Paraffine varnish, obtained by dry distillation of peat.

(6.) Coal tar, applied cold and warm in several layers upon wood externally carbonized. Into some piles holes were bored, which were filled with hot tar and then shut, so that the tar could penetrate into the interior. Some piles were also covered with a mixture of tar and oil of vitriol, to which sal ammoniac, turpentine and olive oil had been added.

(7.) Turpentine with linseed oil paints; among them chrome green and verdigris.

(8.) The surface of the wood was merely carbonized.

The thus prepared piles were immersed in the water at the end of May, 1859. When taken out in September of the same year, it was found, that with the exception of No. 6, none of those alleged remedies had proved effective. The timber coated with the composition No. 6 showed only traces of the attacks of the teredo, but in the fall of 1860, or after one year and a half, it presented a great number of excavations.

The results of these experiments convinced the committee in the most satisfactory manner that no external application furnishes protection. Although such a one may prove useful for some time, the slightest crack or abrasion, produced by the action of the water, ice, or other causes, will form an entrance for the young teredo.

It may here be well to say a word about the coating with iron nails, which, although very expensive, is still largely in use. If this means is to afford protection at all, the square heads must well join together, and the piles, before being immersed, ought to be exposed to the action of the atmosphere, so that the surface of the iron may rust well and fill the spaces between the heads. And yet the Committee on Examination reports that some piles, coated in this manner, exhibited, after years, perforations of the ship worm, although they had been covered with a layer of iron rust over an inch thick.

Concerning the sheathing of lock-gates with iron, copper, or zinc plates, a process often used, it is evident that if this covering remained complete no penetration of the wood could possibly occur. Experience, however, has shown that these plates furnish no enduring protection, owing to the fact that it is impossible to maintain an unbroken or unabrased surface. It has been discovered that nature itself affords a better protection in the case when sea-shells attach themselves to the gates before the larvæ of the teredo have had time to begin their attacks.

In experiments of the second class the following alleged preventitives were tried:

1. SULPHATE OF COPPER OR BLUE COPPERAS. The piles were impregnated in Amsterdam, but it was found in the summer of 1859 that this process was unsuccessful. Yet, in order to be certain that this was really the case, the committee ordered from Paris two logs of beech-wood with the bark, two without the bark, and two logs of pine-wood, all of which had been saturated with a solution of sulphate of copper. These pieces also proved valueless, and the experiments only confirmed the results obtained by the engineer NOYON.*

2. SULPHATE OF IRON OR GREEN VITRIOL.

3. ACETATE OF LEAD.

Impregnation with these salts yielded negative results; also,

4. SOLUBLE GLASS AND CHLORIDE OF CALCIUM. In order to form a silicate of lime in the pores of the timber the piles were first saturated with the soluble glass and afterwards with chloride of calcium. Before they were immersed in the water they were exposed to the air for half a year, so as to effect a perfect chemical union. In March, 1862, these piles were placed in the water, and, on examination in October of the same year, it was found that the teredo had caused great ravages.

5. CREOSOTE OIL. This is a product of the dry distillation of coal tar, which, by a second distillation, is purified from the most volatile as well as from the heavy oils. In the month of May, 1859, pieces of wood satured with oil of creosote were placed at Vlissingen, Harlingen, and Stavoren, in the sea. In September of the same year they were all found free from worms, while other unimpregnated pieces, that had been placed beside them, had been thoroughly invaded. Another trial was made in July, 1860, with ten piles of oak and pine, treated with creosote; and later, piles of beech and poplar were employed that had been treated by BOULTON in England.

All these piles were examined in the fall of 1862, '63 and '64. While those that had been left in their natural condition had been thoroughly invaded, the oak only showed traces of the worm; but, in sawing one of the oaken piles through, the wood was found to have been very imperfectly saturated.

On investigation in the year 1864 it was found that the piles of pine, beech and poplar, treated by BOULTON in England, were perfectly sound, although exposed to the action of the teredo for three years; indeed, not the least excavation could be discovered. After a layer of a certain thickness had been cut off from them they were again immersed, and proved also this time to be perfectly worm-proof.

The same satisfactory result was obtained with piles impregnated by a company in Amsterdam. They had remained in the water for five years. In none of this wood, not even in that which had several times been deprived of its surface layers, could a trace of the ship-worm be discovered. Of the unprepared wood that had been served as counter-proof, nothing but the head-pieces over the water had been left; the rest had become a spongy mass, of no strength.

In all the impregnated piles of oak there were here and there traces of the toredo, owing probably to the circumstance that the oil penetrates with difficulty into this kind of wood. It had finally been recommended to the committee to use petroleum, but, owing to its high price, no trials were made with it.

Under the third head various exotic woods, some of great hardness, were tried. However, the experiments made with them were only a few. It can only be said with certainty that some species of wood from Surinam, American oak, and several others, were not spared.

The Committee on Investigation also received a heavy piece of Guajac wood, which had been laying for five or six years in the sea at Curacoa. Being thoroughly perforated, it afforded the best proof that even the densest wood is useless for submarine constructions.

The committee finally received communications on wood reputed to be poisonous to fishes, but has had no opportunity of

* Sur l'inefficacité du procédé Boucherie en eau de mer. Annales s Ponts et Chaussées, Mars et Avril, 1859.

proving or disproving these sta ements. It was proposed, therefore, by the Dutch Government to make inquiries in the East as well as the West Indies.

The report of the committee sums up with the following conclusions:—1. That mere external coating of the timber with paint or other substance affords no protection; since it is impossible to maintain an unbroken surface, the young teredo will enter the slightest crack or abrasion. The use of copper, zinc or galvanized iron plates is too expensive for most occasions; and even these become of no use when broken. 2. Impregnating wood with soluble inorganic salts which are poisonous to animal life, furnishes no protection against the worm. This is due to the fact that the sea water soon dissolves away their strength, and that the worm does not devour or digest the wood bored out by means of the shelly jaws. 3. The hardness of the wood and its poisonous character, so far as known, are of no avail. 4. Creosote oil is so far the only substance met with that constitutes a true protection against the worm. Attention should therefore be directed to the best and quickest methods of saturating the wood with this material, and to the kinds of wood most absorbent of it. The creosote oil doubtless owes its peculiar powers in the respect just indicated mainly to the carbolic and cresylic acid it contains, and we have thus another illustration of the important applications to be made of the latter substances in our domestic and industrial economy.

Similar testimonials as to the efficacy of creosoting have from time to time been given by eminent engineers and scientists pursuing the study of applied science. In a work published in Paris in 1868, and entitled "*Memoire sur la conversation des bois à la mer*," Mons. A. FORESTIER states, for instance.

"Our studies and experiments have entirely convinced us that of all the numerous processes hitherto known, the only one thoroughly efficacious is that which consists in thoroughly impregnating wood with creosote."

In his evidence, given before the Select Committee on Harbors of Refuge, Mr. ABERNETHY said:

"I am convinced that timber, when creosoted, is not subject to the action of the worm, as far as my actual observation goes; and in that case probably I am understating it when I say it would last for half a century at least."

The earliest wood creosoted, and exposed to the sea in harbors, was at Lowestoft.

At the meeting of the Institution of Civil Engineers, Mr. T. E. HARRISON remarked, that the entrance gates of the Monk-Wearmouth docks at Sunderland, which had been constructed of yellow pine, creosoted twenty years ago by Mr. BRUNEL, were quite sound, but portions of kyanized timber, used in the same works, had been attacked by the worm to a considerable extent.

The use of creosote oil for preserving wood was introduced in 1838 by JOHN BETHELL. In the beginning the oil was valued merely as an antiseptic, but it is now generally agreed that it is not less useful in filling the pores of the timber so as to exclude air, water and putrescent matter.

Concerning the plans proposed for impregnating wood with creosote, we propose to briefly consider the most remarkable ones.

THE PRESSURE PROCESS.—The wood and liquid being contained in, and nearly filling a closed and strong iron receptacle, more liquid is pumped in till a high pressure is attained and the liquid is forced into the pores of the wood. The pressure required for the purpose approaches 200 pounds to the square inch, and the apparatus is consequently very heavy and very expensive. Only well-seasoned and dry wood is suitable for the process, a s it is evident that if the pores of the wood be occupied with sap, no amount of simple pressure will condense the sap to permit the entrance of the preservative liquid. The great cost of setting up and working this process, and the fact that it cannot be effectively used for unseasoned lumber have prevented its extensive introduction into the United States.

THE VAPOR PROCESS.—This process was first carried out on an extensive scale by LUCKEN in 1811, and was revised in England by FRANK MOLL, in 1835, and quite recently by Mr. L. S. ROBBINS in the United States, who brought it before the public as a "Discovery of one of the Lost Arts of the Egyptians." This plan was proposed at a time when the value of antiseptics was over-estimated, and when the necessity of sealing the pores of the ligneous tissue was overlooked. It was also supposed that by simply exposing the wood to the vapor of coal tar, a sufficient amount of the antiseptic would be carried into the pores to afford perfect protection. Leaving out of question the injury to the wood by the high heat, necessary to volatilize the products employed (from 400 to 700° Fahrenheit), it is evident, since the space occupied by creosote vapor is 1100 times that of the same weight of liquid creosote, no available amount can be got into the wood. And. even if it should be completely permeated, no useful end will be attained, owing to the fact, that the vapor on condensation will leave the pores empty.

THE SEELY PROCESS.—The writer has already had occasion to call attention to this process, by which within the past three years, large quantities of railroad, dock and pavement timber have been successfully treated. Although one of the most recent processes, it has attained a high reputation and is already spoken of as the only one fulfilling the requirements of scientific and practical investigation.

The process, in brief, consists in subjecting the wood to a temperature above the boiling point of water and below 300° while immersed in a bath of creosote oil for a sufficient length of time to expel the moisture. When the water is thus expelled, and the pores contain only steam, the hot oil is quickly replaced by a bath of cold oil, by means of which change the steam in the pores of the wood is condensed, and a vacuum formed, into which the oil is forced by atmospheric pressure and capillary attraction. Among the advantages of this plan, the following may be named: The thorough air-drying which is required by the pressure process is obviated; the expulsion of the sap, and the amount of oil forced into the wood, is perfectly under the control of the operator; any desired fraction of the vacuum of the pores may be filled at pleasure. On examination of wood saturated by SEELY'S method of treatment with the microscope, the writer found every pore completely filled with oil, and this not only on the surface, but also in the centre of the piece examined.

Gold Mines in Nueva Providencia, State of Guyana (Venezuela, South America).

THESE mines, discovered in 1848, had been nearly abandoned until six or seven years ago, when several citizens, tired of the civil wars which so often rage in that country, and unfortunately in the other States, went to that of Guayana, seeking the peace and guarantees necessary to insure an honest and laborious life. To the gold mines they directed their steps and efforts, and, to their great satisfaction and surprise, they found out that their work was profusedly rewarded with the precious metal. From this time the mines commenced to improve greatly, and greater exertions were made to discover new veins or filons, as the creoles call them, of auriferous quartz and placer mines, which produce pure gold in considerable quantity, and nuggets of surprising number and weight. In 1866 an intelligent and enterprising individual, being acquainted with these facts and with the extent and richness of the territory, Mr. J. B. AUSTIN, contracted with the Federal Government of the Republic for the organization of companies to work the quartz, and by his exertions a company has been organized, with its principal office in Philadelphia, called the Orinoco Exploring and Mining Company, with a capital of $10,000,000. This company had many an obstacle to overcome and a considerable outlay of men and money to make, always attached to every enterprise of this kind, especially in a country of an extensive territory and few resources and population. Notwithstanding, in March, 1869, the company was able to put to work a twenty-stamp mill, situated on the side of the Yuruari River, in a place named Nacupay. It may be judged what were the results the company obtained from this mill, taking into consideration that before the year ended a new thirty-stamp mill was ordered for another one of the company's grants, and which by this time is in process of erection. These results have produced the organization of six more companies, viz.: 1st. Potosi Mining Company, capital £50,000 sterling, a twenty-stamp straight mill; directors in C. Bolivar, Messrs. HAM, SHOCK & Co. 2d. Caratal Mining Company, rotary twelve-stamp mill; office, New York; Messrs. MOREY & SPERRY. 3d. Compania Minera de Buen Retiro, capital $50,000, a ten-stamp straight mill; office in C. Bolivia; Messrs. J. LAVEAUX & Co. This mill has been at work since November, and although we have as yet no knowledge of the results obtained, it will no doubt prove a most brilliant success, taking into consideration the experiments made with its quartz, far superior to those of the American Company at actual working. 4th. Compania Minera de Callao, capital $50,000; a fifteen-stamp straight mill; office in Nueva Providencia; J. STIEVEL. 5th. Chili Mining Company, ten-stamp straight mill. 6th. New York and South America Gold Mining Company, a twelve-stamp, rotary mill; director, Dr. P. R. STEVENS, N. Providencia. Besides these companies already organized, and whose mills will all be working by next March, there are three other companies in the process of organization, and which will be organized before the end of the next quarter.

The results obtained from the mill, at actual work, belonging to the Orinoco Exploring and Mining Company, from March, 1869, to September, 1870, have been 19,773 ounces, giving an average for these sixteen months of 1236 a month, of which a good many days have been lost by unavoidable and unforeseen circumstances. The whole amount produced, up to November last year, was $444,991 25. These items we have from a reliable source.

The pinta, or place where the company takes its ores from, is by no means considered as an extraordinary one for gold. It is called La Corina, but the El Figre, Peru, Chile, and Callao are far better ones, and afford a much better ore, the last one, Callao, being the richest of all, having produced lumps of gold weighing seven or eight pounds, and a good number of nuggets exceeding one pound weight.

The gold is found in the gravel, at small depths. None of these diggings are more than ten vars (about thirty feet) deep. The gold contained in the quartz is native gold, and the simplest process of amalgamation is used. The veins are very often visible on the surface, and these outcroppings are called by the natives *flor*. They are to be found near the surface, on the slopes and hills, running deeper the nearer they reach the valley. They are very often overlaid by a bed of soft rock, called by the natives *cascajo*. On the valleys where some *carrancos* or diggings have gone as deep as 120 feet they have met with water, and the pumps required to keep it out are beginning to be imported.

These mines are located in a country traversed by hills and mountain chains, which make it quite romantic. About 200 miles off lies the Ciudad Bolivar, capital of the State, about 150 miles from Pto de Tablas, situated on the right bank of the great Orinoco River. The woods are very extensive and afford plenty of good timber for house-building, bridges, etc., and make a first-class firewood. The Federal Government ceded to the State the right of organizing and regulating these mines, and in accordance with this the Assembly of Legislators passed an act providing a law for them, called Ley de Minas. The reported production of the mines in 1869 was 33,555⅝ ounces of gold, and during the first four months of 1870, 14,303⅛, which is probably not more than half of the real production. A very large proportion of this gold is not presented at the proper office, although it is not subject to any duty whatever. This number of ounces were obtained by hand work, the Orinoco Mill being the first successful one introduced in that section. The climate is healthy, except during the rainy season (August, September, and October), when the chills and fever are prevalent. The village of Guacipatry is healthy all the year round, and is only fifteen miles distant from the mines. The yellow fever has never been known in that region.

Besides these deposits of gold, very nice specimens of quartz and gold have been got in different parts of the State, and the general opinion is, that there are other deposits by far superior to those already known further in the interior of the country. This opinion is partly based upon the information and nuggets of gold which the Indians bring in, but from a natural egotism and fear they conceal the source. Intelligence and capital are the things required to make rapid fortunes in that country. Its natural advantages and richness are sufficient to attract the attention of enterprising people, and more especially the people of North America. T. R. O.

Sutro Tunnel.

THE following speech on this gigantic mining enterprise was delivered recently in the U. S. Senate by Senator JAMES W. NYE, of Nevada, and is well worth the careful perusal of the political economist as well as the miner:

Mr. PRESIDENT: It will be seen by the reading of this bill that it is somewhat novel in its character; and the reason why it is so results from the fact that the interest to which it applies is new in this country; and because it is new I shall ask the attention of the Senate to the considerations that I desire to submit.

It has been the custom of this country from the time of its foundation to foster and nurture great interests in their infancy, which custom has been crowned with most eminent success. It gave that protection to the great manufacturing interests of New England and of the country. It gave it to the great commercial interests of the nation, by way of subsidies and other inducements, which enabled us, up to the time of the breaking out of the war, to cope with the nations of the earth in our commercial transactions. And so the Government wisely fostered every other interest controlling in its character.

Within the last ten years a new and very important branch of business has sprung up in this country; and from the geological and mineralogical surveys we have had, we stand here with the knowledge before us that one half of our continent is a mineral-producing region. It is to this new interest that I now invite the attention of the Senate.

Although this bill is entitled a bill to aid in the construction of the Sutro tunnel, it involves necessarily to some extent the reasons why we ask this aid, and the magnitude of the interests concerned therein. To demonstrate the truth of what I shall assume to be a fact, I have chosen as an illustration the celebrated Comstock lode, a lode more noted than any silver lode ever worked in any portion of the world.

The mineral wealth contained in the vast country stretching from the Missouri river to the Pacific ocean, is incalculable. While nature has given but little productive power to its soil, she has stocked its mountains with mineral veins, containing gold and silver, and all the other metals, hoarding up untold treasures. Gold and silver ores, however, are not, as is sometimes supposed, found in large concentrated masses. Nature, in her economy, has so distributed the precious metals as to make their extraction a great manufacturing process—a process which requires a large capital, the construction of extensive works, the erection of ponderous machinery, systematic working, with economy, skill, intelligence, and perseverance. It is true, in isolated instances large bodies of very rich ores are found, containing sometimes millions of dollars, but these are rare exceptions. The real, solid, substantial wealth of our mineral domain is contained in low-grade ores, containing one single ounce of gold, or less, in two thousand pounds of ore, or one pound of silver to the same quantity of material. The extraction of these small quantities of the precious metals from so much bulk becomes a difficult manufacturing operation. The quartz has to be blasted out of the lode, hoisted to the surface, and transported to the crushing mills, where it is reduced to fine powder, and the gold and silver extracted by the means of amalgamating machinery.

The mining operations which are now carried on in this country are, to a large extent, merely of a speculative character. It is a search for rich bodies of ore, while poor ones remain untouched. The result is, that there are as many blanks as in a lottery, while the prizes are scarce in the same proportion.

A most striking example is found in the working of the Comstock lode, the most productive mineral vein at present worked in the whole world, and probably the most important one which has ever been discovered. It has yielded since its discovery, ten years ago, over one hundred and twenty million dollars' worth of gold and silver bullion. The working of these mines is carried on in so expensive and wasteful a manner that only ores assaying at least twenty dollars per ton can be extracted in order to pay expenses, while many million tons of a lower grade are left behind in the mines to remain there forever, or until a more economical system of mining is adopted.

Under the prevailing mode of mining, the mines are entered by perpendicular shafts, of which there are thirty or forty along the whole length of the Comstock lode, which has been explored for a distance of nearly four miles. Upon these shafts steam engines are erected, some very powerful ones, for the purpose of pumping the water, hoisting the ore, and letting the miners up and down. As these shafts extend in depth it becomes more difficult and expensive to pump the water; for no matter in what portion of the mines the same occurs, it all finds its way to the bottom of the shafts, and has to be pumped from that point. As a consequence, we find that after ten years of mining on the Comstock lode, there are now in operation fifty-three steam engines for the purposes of pumping and hoisting, at an enormous expense, the country being devoid of coal, the only fuel to be obtained being wood at a cost of twelve dollars per cord. But it is not only the expense of fuel, but

the numerous staff of engineers and firemen and the wear and tear of machinery which makes the cost foot up several millions of dollars per annum.

The most serious obstacle, however, which is encountered in deep mining is the rapid increase of temperature, the thermometer standing at many points in the lowest workings of these mines (twelve hundred feet beneath the surface) as high as 110°. The heat at these points is almost suffocating, and its evil effect is still further increased by a lack of oxygen, which hardly allows a candle to burn, and in that foul and heated atmosphere, filled with noxious gases, thousands of miners spend their prime of life in order to earn a living, contracting the seeds of consumption, which carries off a large percentage at an early age. The natural increase of heat amounts to one degree to every sixty feet of descent. This is largely increased in this locality by the heat generated by the decomposition of large masses of mineral, while the breathing of several thousand miners and the burning of thousands of candles still further increase the same.

That, under such circumstances, the labor performed by a miner must be very limited, appears quite evident; and it has been estimated that in such places the labor accomplished is but one-fourth of that which could be done in a cool, healthful atmosphere. Considering, then, that miners get four dollars in gold for a day's work of eight hours, while they can perform but two hours' labor, a day's wages amounts to sixteen dollars. Indeed, mines must contain almost solid silver to make them profitable with such a waste of money. In a humanitarian point of view, such a barbarous state of affairs should not be suffered to exist while these evils might easily be removed. Under the present system of mining, the ore is hoisted to the surface, and from thence transported to the crushing-mills, which are principally located on Carson river, at a distance of from eight to twelve miles. The expense of hoisting and transportation to the mills is estimated at from three to four dollars per ton; the extraction averaging fifteen hundred tons per day, which creates a daily expense of over five thousand dollars.

The mining system proposed by Mr. SUTRO, by means of a great tunnel or adit, will remove all these difficulties. He proposes to construct a horizontal tunnel, commencing at the very base of the mountain, near Carson river, and having a westerly direction, which will cut the Comstock lode, at a distance of four miles, at right angles, and at a perpendicular depth of about two thousand feet. After reaching the lode the tunnel will be continued to the right and left, under and along the lode, for three miles more. The shafts which now exist may then be continued downward until they connect with the tunnel.

The advantages which are thus gained are manifold and of great importance.

In the first place, the water, the pumping of which is a never-ceasing labor, will be carried off forever, by its natural flow, to a depth of two thousand feet all along the lode, and all pumping machinery now existing on the surface may be abolished. For if all that exists, say one thousand feet above the tunnel, be collected in reservoirs in the mines themselves, it may be carried down in pipes to the tunnel level, thus forming a column of water one thousand feet in height, furnishing an immense motive power for propelling machinery, which can be made to pump the water from a depth of probably more than a thousand feet below the tunnel level, and, furthermore, furnish the power for hoisting the ores from that depth. Thus, the very water which is now but a source of expense and difficulty, will be utilized and turned to account.

In the second place, the shafts, once connected with the tunnel, will be the means of ventilating the mines and cooling the atmosphere in the most complete and effectual manner; for after such connection is accomplished these shafts will act as chimneys, two thousand feet in height, producing an incalculable draught, carrying off the foul and heated atmosphere, while the cool, pure air entering the mouth of the tunnel will ascend and find its way to all portions of the mines. The heat will thus be removed, and the miners will thereby be enabled to perform a full quota of labor without detriment to health.

The tunnel, furthermore, will offer extraordinary facilities for transportation. While, under the present mode of working, the ore is hoisted up to the surface, and thence transported at an enormous cost, it may after its completion be dropped down to the tunnel level by its own gravity at no cost at all, and on a railroad to be constructed in the tunnel, transported to the river, a distance of four or five miles, at probably one-tenth the expense of the present system.

This great reduction of the cost of mining and transportation will make it possible to extract to advantage the many millions of tons of low-grade ores which have been left behind in the mines, and thus make them available. Without the tunnel the great wealth contained therein will forever remain dormant and be lost to the world.

But it is not only by the reduced cost of mining which the tunnel will furnish, that the ores can be made available for milling, but such facilities will be furnished for the purpose of concentration that even ores of the very lowest grade can be turned to account.

The concentration of ores probably forms the most important chapter in mining; for if ninety per cent. can be removed by this means the remainder or concentrated portion will pay for reduction. The tunnel will furnish all desirable facilities for this purpose, for cheap water-power may be employed near the mouth of the tunnel, while the water flowing from the same may be used in the process of concentration. This process is based on the difference in specific gravity of the mineral-bearing particles in the vein matter, which, after being reduced by crushing-machinery to the size of grains of wheat, are allowed to drop on shaking-tables over which water is made to flow. The shaking motion of these tables carries back the heavier particles to the point where the water enters upon them, while those of less specific gravity, that is, the worthless matter, are shaken forward and carried off by the water at the point of discharge. Nearly all mining in Europe, guided by experience and intelligence, has been brought to its flourishing state by the concentration of ores, and it is only by that means that we shall ever be able to economize and make useful the great wealth contained in the less valuable ores.

In the remarks which I have made, the utility of the proposed tunnel is pretty conclusively set forth, and it must appear evident that, without its construction, these mines must shortly be abandoned.

It is not only the loss of the enormous yield of these mines, which almost equals in production that of the whole republic of Mexico, but it would be a calamity to all our mining interests to have them no longer worked, within a few years after their discovery, and after it has been demonstrated that the wealth contained therein is unlimited.

It may be asked why private capital does not enter into this undertaking—one that promises such magnificent results. Every effort has been used in that direction, but has utterly failed. The work is of so gigantic a nature—the cutting of a tunnel for seven miles through solid rock, four miles of which must be accomplished before the Comstock lode is even reached—that private enterprise in this country will hardly be equal to it.

We find that the great mining tunnels in Europe have received assistance from the various Governments, and even great railroad tunnels, such as that of Mont Cenis, have obtained such aid. But the greatest obstacle in getting private capital to enter this gigantic work is based on the fact that capitalists—that class of men brought up to believe in nothing they cannot see, men who are accustomed to lend money only when they have collaterals in their own hands—want first to see the ore in the lode at the great depth at which the tunnel will strike it. Capitalists are a timid and sceptical class of people, and as a body are highly unscientific; they do not believe in theories; they believe a thing when they see it. If these men could see the ore in a mine, at a depth of two, three, or four thousand feet, they would believe that it is there; but no arguments, no theoretical proofs, geological evidences, or philosophical deductions will make them invest their money. If that tunnel to the Comstock lode were an accomplished fact, if these unbelieving capitalists could be taken into the very bowels of this argentiferous mountain, and there behold the wealth which we have every evidence to believe exists down there, then they would believe it. This class of men, whose capital is required to open up our vast mineral resources, would then commence to realize that we have thousands and thousands of millions of treasure in the earth; that nothing but capital and patience is required to extract the same; that mining can be made as safe a business as cotton spinning or the manufacture of iron. And as a result, we will see our vast mining regions populated with a thrifty, prosperous people; we shall see tunnels constructed by private enterprise in all our mining regions, an immense value given to our mineral lands, the production of the precious metals largely increased, and the whole nation benefited and enriched.

This question becomes of momentous importance when we consider that one-half of our domain is mineral-bearing, and the consequences incident to one practical demonstration surpass all calculation. Let no one say that this question is local in its bearing. It not only affects all of the mineral-bearing regions, but the balance of the country also. It affects the manufacturing interests of the East and the agricultural interests of the West, and eventuates in the aggregation of the whole nation. It opens a wide field for labor, and brings into requisition every mechanical art of the country.

But it will be asked: Suppose it be proven that the Comstock lode reaches down indefinitely, how will that prove it for other lodes? Modern geology has so clearly established the characteristics which distinguish true lodes or true fissure veins, that their continuance to great depth, once practically shown, will apply in every case. A vein once explored to a depth of three or four thousand feet, while the deepest workings ever reached by man since mining was known, do not exceed twenty-seven hundred feet, would not only have an extraordinary scientific value, but it would absolutely establish the continuance of true fissure veins in all instances where the same characteristics prevail. It has been satisfactorily demonstrated that this class of veins has been formed by fissures rent in the earth at a time of great volcanic convulsion. These fissures often follow the contact of two kinds of rock, as offering the planes of least resistance. So we find that the Comstock lode follows for some distance the contact between syenite and greenstone, the first being the older formation, and forming Mount Davidson, and the latter, a more recent one, constitutes the country east of Mount Davidson, which, sloping down under the greenstone at an angle of forty-five degrees, gave that inclination to the lode. The fissure, however, did not follow the plane of contact altogether; for at both extremities where Mount Davidson rounds off to the westward, the fissure did not follow this semi-circle, but, in an almost straight line, broke right through the greenstone both at the northern and southern end of the lode.

This probably also accounts for the more perpendicular dip of the lode at these points. The fissure, with the inclination already indicated, would, shortly after its formation, have closed up again on account of the immense weight of the superincumbent mass, particularly since it attained the great width of two hundred feet, had it not been for the fact that large masses from the hanging wall became detached, not having longer any support, and were precipitated into the open chasm, into which they descended until they became lodged and wedged in, and thus formed a support for the hanging wall. Some of these masses were of immense structure, probably five hundred feet long, and several hundred feet in thickness. And other masses continued falling in, in large bodies and brecciated masses, during untold ages. The filling of the fissure took place at a later period, and probably lasted during thousands of years, or, as geologists say, during millions of years, principally, in all probability, by sublimation from the great laboratory in the centre of the earth, until all the space around these fallen masses became filled with gold and silver quartz.

That quartz, and nearly all metals, may be evaporated under certain conditions can be shown even in our own chemical laboratories with the imperfect means at our command. We can demonstrate, for example, that silica or quartz can be sublimated by means of florine gas, and gold and silver and other metals by the aid of chlorine gas. In this connection a case may be recollected where a deficit occurred in the accounts of a melter and refiner in one of our mints, amounting to many thousand dollars, which was accounted for by the statement that it had gone up the chimney. This was received with great ridicule, but an investigation showed that the roofs of the houses adjacent to the main building were covered with particles of gold, and considerable amounts were actually scraped off, thus showing conclusively that the gold had gone off in a gaseous form, probably by the presence of chlorine gas in the metals or the furnaces. If we imagine, therefore, the immense heat which is supposed to exist in the centre of the earth, under a pressure of which we have no conception, together with the presence of the gases referred to, which are emitted at times of volcanic action even at this day, together with steam superheated to a degree which we cannot produce, we may readily suppose that they may have acted as solvents to the precious metals and other materials which we find deposited in our mineral veins.

Modern geologists agree that true fissure veins have mainly been filled in this wise, and, that being the case, the supposition that they give out at any depth which can be reached by mining appears simply absurd. The very surface, at which we find at present the out-croppings of mineral lodes on our mountain ranges, is several thousand feet below the original surface, for the corroding action of the atmosphere and the elements have worn them off to that extent, and filled up the valleys below, forming the placer diggings which abound in California and the Territories. How can we then suppose that mineral lodes, the deepest workings of which on this continent have never yet reached two thousand feet, should fail at that depth?

The miners, in descending on a mineral lode, suddenly lose the ore and get into country rock. They may persevere and continue their shafts for several hundred feet and still not reach ore again. Their means give out and they become discouraged and declare their mines have failed.

But let us turn to the mines of Europe, those of Cornwall, the Harz, Freiberg, and of Schemnitz, which have been worked for centuries, some of them for a thousand years. There we find, from the maps and the records kept, that these masses of country rock, these barren spaces, have been traversed and the lode found unimpaired beneath. The popular belief that lodes contain nothing but mineral matter is a grievous mistake. As has been shown, the largest part of a mineral lode consists of barren matter, and hence the difficulty in mining. On the Comstock this is also the case, and numberless exploring drifts are required to find the valuable mineral. During this time of search the engines must be kept in motion at an enormous expense; and it is not to be wondered at that the hundred and twenty millions produced by the Comstock lode have been swallowed up in making these explorations under the expensive system now prevailing.

But, to come back again to the evidences that the Comstock lode was once an open fissure, we find, upon examination, that the masses of country rock imbedded in the vein—which are called "horses," a term derived from the Cornish miners—all along the contact between syenite and greenstone, consist of the latter; and why? Simply because the greenstone, forming the hanging wall of the fissure, portions of which became detached therefrom by the laws of gravity, dropped into the fissure. The greenstone fell downward, while the syenite, being at the bottom, or forming the footwall, could not fall upward; and thus we do not find a single eyenitic "horse" in the Comstock lode, but nothing but greenstone—a most conclusive evidence that the fissure was once open.

True fissure veins have many other peculiar characteristics, and can be easily recognized. Among others, they are accompanied by clay seams, which lie between the "country" rock and the vein matter. This clay has generally a bluish color, is very tough, and consists of very finely-ground particles. It is so tough that it is almost of the consistency of lead, so that a pick driven into it will not penetrate more than a few inches. This clay forms a continuous coating of the vein matter, and is impervious to water, so that all water contained in the lode remains confined to it. Where it lies on the vein matter the latter is polished as smooth as marble. The question then arises, how has this clay been formed? We find that a level drift at right angles through the Comstock lode, after a year or so presents a most extraordinary phenomenon. The vein matter is often found to have risen up a foot or more, and after another year it may be down that much beneath the level of the country rock. The ordinary observer will ascribe this to the swelling and shrinking of the vein matter, but the geologist who has carefully examined it will pronounce it a motion which is taking place between the country rock and the vein matter, similar to the grinding of two planks against each other in a ship in a heavy sea. Astonishing as it may seem, such appears truly to be the case; and the clay, which we find imbedded between the country rock and the vein matter has been formed by trituration and rubbing off from both, which

accounts for the polished surface of the latter. A slow motion of this kind takes place only on a true fissure vein—a vein which is supposed to reach down indefinitely—and by an action which emanates from the very bowels of the earth.

To set at rest any doubt about the reality of this motion a simple examination of the clay need but be made. If it be examined and assayed at a portion of the vein which is barren of ore, the assay of the clay will show no trace of gold or silver. An assay, however, of this clay at any portion of the vein where the ore is rich, will show a similar amount of gold and silver, proving most conclusively that it has been formed by rubbing off from the vein matter.

It would be useless to go any further into a description of the characteristics of true fissure veins. The evidences which I have adduced apply to all such lodes, and the fact once actually established that the Comstock lode reaches down three or four thousand feet, so that capitalists may go there and see for themselves, will apply to all other lodes which bear the same evidences. It will apply to the gold and quicksilver mines of California, the copper mines of Michigan, the lead mines of Illinois, and Missouri, and the mines of the Carolinas and Virginia.

The value of such an exploration, in a scientific view, can hardly be estimated. Our knowledge of geology is largely based upon the workings of deep mines. How interesting and important would it be to make an examination on this continent of the most productive deposit in the world to a much greater depth than has ever been reached before! The scientific men of Europe would carefully watch the progress of the work and the developments which will be made, at greater depth than have been reached by explorations of a thousand years. Millions of dollars have already been expended by the Federal Government and by those of the different States upon superficial geological surveys. This work will be a practical, absolute, and positive survey into the very bowels of the earth of greater practical value than any heretofore carried out.

Mr. President, I may be asked by what authority this fund can be set aside for this purpose. My answer is that the same authority which authorizes the Government to make appropriations for geological surveys upon the surface, from which the theory of geology is deduced, and by which we must be guided—the same law and right and power which justifies that exists for making geological surveys under the earth.

This bill, as amended, proposes to set aside the money arising from the sale of our mineral lands to create a fund for two purposes. The first provides that a certain percentage of it shall be advanced to the Sutro tunnel when that has reached a certain point. The details of the bill I will not now go into; but assuming the right to exist, I ask senators if it is wise and prudent to do this? In order to answer that question correctly, let us inquire for a moment what our mineral products have been and what they probably would be under a system of tunneling as thorough as this. Let us have one great demonstration—a demonstration ocular, a demonstration not by any theory to be overthrown, but a demonstration positive—that as deep down as humanity can delve in the depths of the mountains there are these great mineral resources richly stored. Is it policy, then? I assume that it is; and assuming that, I have ventured to call up this bill and ask for its support at your hands.

Now, sir, when I talk of this mining interest I hope I shall not be answered from any quarter that I live in a State where mining is the great occupation. I answer that I do; but I speak of mining and of fostering it, and of its full development, with no particular reference to the State in which I live. There are other as rich mineral territories as that of Nevada, and they are being discovered and developed every day by private enterprise. But private enterprise is not adequate to perform this demonstration that the world needs. Why, sir, establish the fact that the Comstock lode at four thousand feet below the surface of the earth is as rich as it was upon the surface, and you can make your calculation of what it will produce as well as you can how many bushels of wheat it will take to make a barrel of flour, and the nation's wealth by that discovery can be counted upon as certainly as in regard to any other productive industry.

So great an extent of our country is now engaged in these mineral explorations that it seems to me the time has arrived when the Congress of the United States should recognize the labor of these daring explorers. Mining takes the boldest operations. You start at the base of a mighty mountain; within it you are convinced that there is wealth to an untold amount; and then you see the miner with his chisel and his hammer strike into that mountain side with a boldness that challenges the admiration of the whole community. In and in he goes until he is exhausted in means and in health, and then some rich company takes the tunnel as started and drives it still further on. I want the nation to aid this work by setting apart a portion of this fund, arising from the sale of mineral lands, so that we can demonstrate not only to ourselves but to the world that we are the richest mineral-producing country on earth.

I hope, Mr. President, that this bill will receive that consideration at the hands of the Senate which it so richly deserves. Its benefits are not confined to any locality, but it embraces the whole nation. The gold that we dig from our mountains falls into the lap of New York as naturally as the products of the fields of Indiana find their market there. Therefore, the fact that we produce and the East gets the fruit of our production, returning for it its equivalent, to be sure, robs it of all local interest and makes it a question as important and as general as a question of commerce or of protection to manufactures. I hope that this bill will find that favor with the Senate which I am sure it will with the mass of the people, and which will eventuate in its passage.

MINING SUMMARY.

California.

THE IDAHO MINE.

The Grass Valley *Union* has the following condensation of the reports of the officers of the Idaho Mining Company, showing the condition of the mine, and detailing all the work which has been done for the year which has just passed. During the year there has been 88 feet of shaft sunk, 449 feet of drifts run, and 330 feet of winze raised. The six hundred-foot level is now being opened, while the shaft is being sunk for the seven hundred-foot level. The shaft is now down forty-one feet below the six hundred-foot level. From the sixth level (600 feet down) the drift running west is in 112 feet from the shaft, and the drift east, on the same level, is in 117 feet from the shaft. From the fifth level, 1320 tons of quartz have been taken, and that level is now being worked. The fourth level, 400 feet down, and all the levels above it, have been exhausted. During the year, three steam pumps, known as the Stoddard pumps, have been put into the mine, and the Cornish pump has been taken out. This gives room for more hoisting-way in the shaft, as the compartment heretofore used for the Cornish pump to work in is now used as a hoistway. The Stoddard pumps do all the work required at the Idaho, and the three are run at about the same expense as was required to drain the mine with the Cornish pump. The Stoddard pump has been used since July last, and has proved entirely satisfactory to the Idaho Company. The water in the Idaho mine, however, is easily handled. The company have put in during the year a new ten-inch cylinder hoisting-engine and a new boiler. They have also repaired and retimbered 303 feet of shaft. The mill, which is a fifteen-stamp one, has been kept constantly running during the year. The crushing for the year is 9782 tons of quartz, which gave a gross yield of $187,034 10, or an average of $19 03 per ton. The labor account of the mill and mine amounts to $85,523 61. This includes all the labor performed on the surface and under ground. The other expenses of the mill and mine amount to $30 384 04, or a total for expenses of $115,007 65. The cost of the quartz, therefore, in milling and mining amounts to $11 85 per ton, or a profit of $7 15 per ton on the rock crushed. During the year, the repairing and construction expenses have been $12,699 75. The sulphurets saved have cost the company the sum of $3339 12 in saving and working the same, and these sulphurets yield the sum of $8669 04, giving a profit of $5329 95 on sulphurets. The receipts from all sources by the Idaho Company for the year amount to $ 89,964 57. The dividends declared amount to $12 to the share, and amount in the aggregate to the sum of $37,200. The cash on hand is $11,358. The company have paid out during the year, for attorney's fees and patent to the ledge, the sum of $2442 50. The Stoddard pump cost the Idaho Company $2500. The number of men employed at the mill and mine is 101, and of these all receive $3 per day, excepting twelve men, who get $2 50 per day as wages. The trustees of the company for the ensuing year are Messrs. EDWARD COLEMAN, WILLIAM YOUNG, THOMAS FINDLEY, JOHN C. COLEMAN and M. P. O'CONNOR. The officers of the trustees are EDWARD COLEMAN, president; WM. YOUNG, vice-president; THOMAS FINDLEY, treasurer; M. P. O'CONNOR, secretary. EDWARD COLEMAN is superintendent of the mine. The trustees and the officers are the same as last year. The prospects of the mine are fair, and the affairs of the company are prudently and economically managed.

MINES IN MONTEREY.

The Salinas *Standard* of January 7th says: "It is reported that valuable discoveries of gold and silver have been made in the Gavilan range, near Natividad. Our worthy fellow-citizen, MANUEL A. CASTRO, of New Republic, is said to be one of the fortunate owners and discoverers. Should the mines prove to be permanent, and as rich as reported, it will be a new source of prosperity to the Salinas valley, and make Natividad one of the most prosperous, as it is already one of the most pleasant, towns of our valley."

QUARTZ IN CALAVERAS.

The Calaveras *Chronicle* of January 7th contains the following mining intelligence: "One of the richest quartz ledges ever discovered in this county has recently been found by ANDREW SANDERSON, of Railroad Flat. The lead is located near the Calaveras river, not over a mile and a half from Railroad, and, so far as prospected, promises to develop into one of the best mines in this section of the State. Nine tons of rock were hauled to Randolph's mill in Railroad, and crushed. On Monday last Mr. SANDERSON showed us the proceeds—a 'chunk' of gold weighing fifty-six and a half ounces, an average of about $107 per ton. Considering the rock was from near the surface, and entirely unassorted, we do not believe a better lot of quartz was ever crushed in Calaveras county. He has christened it the 'Champion' lead, and it promises to merit the appellation. We have been shown some specimens of quartz taken from the bottom of the shaft at the Palomo mine, Lower Rich Gulch, that are certainly promising 'indications' of the richness and permanency of the lead. Free gold is visible all over them, and the rock contains a large quantity of sulphurets, that assay $2000 per ton. The specimens were procured at the depth of 400 feet. At that point the vein is eight feet in width, three of which are composed of the character of rock shown us. The batteries at the Palomo are being crowded to their utmost capacity, and we are informed that the mine is paying well."

Montana.

IMPORTANT MINING DECISION.

A case has been presented to the General Land Office, in which an application for a patent for 160 acres of surveyed placer land was rejected by the Register and Receiver at Helena, Montana, for the reason that the claim in its exterior limits did not conform to the legal divisions of the public lands, as required by section 12 of the amendatary mining law of July 2, 1870. The Commissioner, upon a review of the same, has just reversed the decision of the Register and Receiver, and decided that ten acre lots on surveyed land, in mining States and Territories, are legal subdivisions of the public lands; and that such legal subdivisions may be either 10 by 10, or 5 by 20 chains in size, to suit the case. He says: "In the case in question, it appears that the applicant desires to enter and secure a patent for the 160 acres of surveyed land, to be segregated from the public domain in contiguous, ten-acre lots, in such manner as to embrace the gulch or placer-claims for which he desires a patent. There is no reason why this should not be done, if so desired, inasmuch as the second proviso to said twelfth section authorizes the subdivison of forty into ten-acre tracts, thus recognizing in mineral regions a ten-acre lot as a legal subdivision of the public lands; this provision of the law having been formed for the very just and liberal purpose of enabling miners to prove up and pay for their claims with the least possible chance of difficulty or interference with adjoining mineral or agricultural claimants. The law does not stipulate that these ten-acre subdivisions shall be in the form of a square, each side measuring ten chains, and it is held that if a ten-acre tract, one side of which is five and the other twenty-five chains, will better embrace the mining premises applied for, no objection to such claim being so surveyed should be made, provided, of course, that such surveys are not run diagonally to the lines of the regular surveys, but are parallel to the same, so that the public lands from which such tracts are segregated may be described and disposed of without confusion or difficulty. In the case under consideration, should the view of the Register and Receiver be sustained, the mining claimant would be compelled, if he entered the land at all, to embrace in its application 400 instead of the 160 acres desired by him, a large portion of which may be occupied by adjoining claimants, either for mining or agricultural purposes, or it may be barren or waste, unfit for either purpose. To require mining claimants in cases like the present to postpone making applications for patents until adjoining miners are willing to unite in making a joint entry of their respective claims, or to include in their applications large areas of worthless land to be paid for at double the minimum price of good agricultural land, would not only be a hardship upon the miners, but inconsistent with the intention of the statute."

VIPOND DISTRICT.

We are indebted, says the *Independent*, to Mr. B. F. HARVEY for items from Vipond district, Beaverhead county. The extent of the mines in that district are not known, owing to the small amount of prospecting heretofore done. Mr. H. says that there is a section of country twenty miles long and eight miles wide that is covered with float quartz, some of which is very rich. An occasional boulder is found of immense size that contains rich ore. A party intend to blast some of these boulders in order to get the pay rock, all of which can easily be reduced by mill process, and even much of the float rock is rich enough to mil. Several new discoveries have been made the past season that are thought to be rich. One of them called the "Brick," has an eight foot crevice filled with solid quartz, which is of good quality. Messrs. BECK, PATTEN, MANSFIELD, SPURR and others, will sink upon their leads this winter, and doubtless by next summer the value of the district will be determined. There is no question but the rock is very rich, but as yet sufficient developments have not been made to fully determine the character of the veins.

ROCK CREEK DITCHES.

A gentleman from Pike's Peak informs us, says the *Independent*, that the work of enlarging the lower Rock creek ditch has been completed. It now has a carrying capacity of 700 inches—double its former capacity. A reservoir will be constructed before spring of sufficient capacity to catch all waste water, which will be no small quantity during the season. These improvements will be of material benefit to claim owners in that section next summer. Some improvements have also been made by the Rock Creek Ditch Company. They have blasted off the points of rock that narrowed the ditch, and removed all that were liable to slide into the ditch in the spring. Last season the company lost much time and money by these obstructions. The ditch is now in excellent condition, and no fears are entertained of interruption by slides another spring.

CABLE CITY.

Messrs. LARKIN and MURPHY, from Cable, report business as very good, and money more plentiful than for many months past. Seven or eight business houses contribute solid and fluid comfort to the denizens of the burg. The survey of the new ditch has been completed, and the contract will be let in a few days. The Cameron mill is pounding out gold at the rate of about $1,000 per day. The mine is looking well.

INDIAN CREEK.

By the *Montanian*, January 12, we have the following intelligence from this locality:—"The Pittsburg Mill is finished, and is said to be one of the best in Montana. It was started up some days back, but the quartz having been out some time and frozen, they found it impossible, during the cold weather to run. The mill we understand has been closed until spring. There are several hundred tons of rock out on the dump, and work is being vigorously prosecuted on the lode. All are sanguine the quartz will pay.

Messrs. KEATING & BLACKER, at Radersburg, are pounding away, and cleaning up large amounts of amalgam each week. Since the improvements were made on their mill it works splendidly. The Keating lode is looking better every day. The sample mill mortars gave way some days back, and the mill has been closed for repairs, and will likely not start again until spring. The Iron-Clad lode has proven itself to be one of the first lodes in the Territory, and all the claims open look well; a number of other lodes in the district are turning out rich. NAVE & Co., are pushing their works and running their mill regularly.

The *New Northwest* in its review of the past year says: "Deer Lodge County yielded one-third more gold in 1870 than it did in 1869. It was estimated that to October, 1869, the yield of the county had been $24,000,000 and fully four millions might be added for 1870. Its two hundred and eighty miles of public ditches carrying 20,000 inches of water have been largely added to, and their aggregate value will exceed $700,000. The Upper and lower Race Track, Cable, add Butte Ditches will when completed open up new mines, extensive and rich, ere even the oldest are nearing exhaustion. We have acquired telegraphic communication, the establishment of direct stage and freight lines between Deer Lodge and Corrine, enabling the receipts of freights, passengers and mails as quickly and at as low a cost as our Virginia and Helena neighbors. Deer Lodge City has nearly, if not quite, doubled her population, building, property valuation, and business during 1870. We now have five stage and express lines, against one in 1870. Two banks are instituted; a telegraph office is opened; steam machinery is in operation; roads are built to populous camps; stone and brick buildings are superseding wooden ones; the number of business houses and manufactories have largely increased, and the indications are that the coming spring several more wholesale houses will be established here."

A friend from Phillipsburg gives the *Independent* the following items from that camp: "The James Stuart mill, under the management of Capt. GEO. PLAISTED, is running finely and constantly, crushing about twelve tons of ore per day. The Captain has ten men employed in taking out ore from the Company's mine. DURFY & Co. have a contract and are busily engaged in taking quartz from Mr. MERRILL'S mine, on the Comanche lode. MURPHY & Co. are taking out large quantities of very fine ore from the Irish Republic lode. Messrs. MERRILL & ULLERY are raising some good ore from the Franklin lode, the assays from which range from $109 to $223 per ton. Mr. MCLEOD is preparing to commence active operations on Comanche. No. 3, east."

—A stampede took place last week, says the *Pioneer*, to a tributary

of the Bitter Root river, caused by a report that from four to five cents to the pan had been obtained in the gravel; ground frozen so that prospecting could not be prosecuted.

Colorado.

MINT AND BANK STATEMENTS—GOLD AND SILVER PRODUCE FOR 1870.

We find in the Denver *News* the following synopsis of the gold and silver operations of Colorada for the year 1870, as fully as they could be obtained:

DENVR BRANCH MINT.

	No. of Deposits.	Value.
January	63	$49,900 10
February	76	58,814 93
March	65	48,801 08
April	82	48,170 79
May	162	76,036 30
June	234	99,474 77
July	247	108,210 78
August	254	119,565 22
September	222	160,358 96
October	194	91,752 02
November	130	53,81[illegible] 27
December	97	52,546 68
Total	1,826	$967,447 90

In the last six months of the year there were 1444 deposits, of the value of $586,249 93; showing a very gratifying increase in both number and amount. No silver passes through the mint, and the values given mean coin.

EXPRESS AND FREIGHT SHIPMENTS OF BULLION.

There passed through the United States, and WELLS, FARGO & Co.'s express office, from $190,000 to $210,000 in bullion per month. Dividing the difference to get the average, and multiplying by twelve, we have for the year $2,400,000, at shipping value, which was probably ten per cent. below the actual value. The above amount is made up of gold and silver bullion and gold dust. No ores nor matte went by express. Professor HILL, of Black Hawk, ships the products of his works mainly in the form of matte. Some months ago he forwarded quantities of dressed and higly concentrated ore, but now, we think, it all goes in matte. He sends about ten tons, or twenty thousand pounds, per week; making 520 tons per year. From the best information we have been able to get from time to time, it is worth at least $170 per ton, or $17,000 per car load, giving for the year $884,000, which we are satisfied is rather under than over the exact figure. The Terrible mine, at Georgetown, concentrates its ore and ships in that form. Since the 15th of last April it has sent to Liverpool eighty tons of first-class ore, averaging $625 per ton, giving $50,000. There has been taken out in the same time 400 tons of second-class ore, worth $160 per ton, giving $64,000, and 800 tons of third-class ore, worth $65 per ton, giving $52,000, or a total for the mine in eight and a half months of $176,000. It is doubtless safe to estimate that $500,000 have been carried east through Denver, in private hands. Much of the gold gathered in the mines of Park, Lake and Summit counties goes out by the way of Colorado and Cañon cities, to Pueblo, and thence east without coming to Denver at all. So of the product of North Park, Snake and White river mines in northern and northwestern Colorado. It finds its way to the line of the Union Pacific railroad, and thence East or West. At least $40,000 in gold and silver are used in Denver for the manufacture of jewelry and plate. Probably as much more in Central and a like amount in other towns of the Territory; all of which is of home production.

We estimate the yield for the year as follows:

Shipped by Express	$2,400,000
Add ten per cent. for actual value	240,000
In private hands from Denver	500,000
Shipments in matte	884,000
Shipments and Terrible ore	176,000
Other concentrated ores	30,000
From Southern mines	100,000
From Northern mines	150,000
Used in manufactures	120,000
Total coin value	$4,870,000
Add 12 per cent. premium	584,400
Total currency value	$5,454,400

From the Georgetown *Miner*, of January 12, we take the following items of mining news:—"Work is actively going on in all the tunnels around Georgetown. The Burleigh tunnel is now over 800 feet in length and during the past week considerable water has been met with. The Marshall tunnel is over 900 feet in length and in a short distance will cut the O. K. lode. The Monticello tunnel is 253 in length and is going ahead at the rate of 8 or 10 feet per week. We expect soon to be able to record a strike in some of our tunnels. By a private letter from Summit county, we learn that considerable mining is being done over the range. Such parties as own ground in which drifting can be carried on are hard at work, getting out dirt for washing. Ground in Humbug gulch is paying remarkably well as is also portions of French gulch. With an average snow fall during this winter, Summit county will see an unusually busy season in 1871, and much more gold will be taken out than during last season, as much new ground will be opened and worked. The German Reduction Works of Messrs. HUPEDON & Co., after having remaind idle for some time, have started up. The water wheel works well and the establishment is prepared to treat ores cheaply and expeditiously. Quite a quantity of third-class Terrible ore is being treated for MR. R. O. OLD. From November 10, 1870, to January 1, 1871, the Stewart Silver Reducing Company have treated 306½ tons of ore, the assay value of which was $50,163.46. From this ore bullion to the value of $40,130.77, was obtained, being 80 per cent of the value of the ore. The average assay value of this 306½ tons of ore was $163.66, coin per ton. This is a pretty good average, inasmuch as the ores was from a number of lodes. Work has been resumed in the celebrated O. K. lode, Leavenworth mountain, by its new owners. A contract has been let to JOHN C. EGAN to run a tunnel to cut the lode between numbers one and two east. The tunnel will be about 100 feet in length and will cut the lode at the depth of 80 feet. Work will continue day and night until finished.

THE DENVER ARTESIAN WELL.

The *News* gives an interesting account of the progress, difficulties encountered, ond encouraging prospects of the artesian well commenced last summer, on one of the hills east of the city. The necessary tools, engine and men were procured, a shaft sunk to bed rock, and boring commenced. At 250 feet the water rose 80 feet. The strata passed through being a soft soap stone there was great difficulty from caving, but the bore was carried down 430 feet when casing became indispensable. Two hundred and sixty feet of casing was then ordered and put in without trouble, but more was necessary Two hundred feet more was ordered, but was two months in arriving. Then, after great trouble and some delay, enough casing was put in to make 396 feet, when a slide deflected the column one joint above the lower end. Then came more trouble in straightening it; then came the cold December snap, freezing up everything. Since the weather moderated the pipe has been straightened and boring recommenced. At 530 feet the soap stone was passed and a stratum of fine grained sand stone entered. With it came a powerful stream of water, filling the well 300 feet. Then came more caving, and drilling had to stop at 536 feet. This was on Wednesday last. On Thursday the casing was driven nine feet, and will be pushed down and drilling recommenced. The water has risen to within 120 feet of the surface, high above the streets of Denver, and is pure and soft. It is believed that 250 or 280 feet further will give a flowing well. The work so far has cost $6000, and a few citizens have borne the burden. At a meeting of the subscribers it was resolved to ask the city and county each to contribute $2000 to complete the work. Considering the public benefit conferred if the well is a success, as it seems likely to be, there is little doubt that the city and county both will help through the enterprise. The same machinery will be available to sink many wells in different parts of the county, providing this is carried to a success.

Arizona

LARGE SALE OF MINING PROPERTY.

The Lucson *Citizen*, Dec. 10th, has the following:—The owners of the Harris Mine, the Mountain Mine and Quartz Mill, at Apache Pass, have just closed a sale of all their mining property, consisting of 3000 feet in the Harris, 2400 feet in the Mountain, with the water privileges attached to each, and the mill, for one hundred and forty thousand dollars. The purchasers, JAMES B. COOPER & Co., of San Francisco, have given a contract under bonds for the renewal and reconstruction of the mill at Bear Springs, and the construction of a good wagon road from the Harris mine to Bear Springs, the prospective site of the mill, and a certain amount of rock to be taken from the mine, for the sum of twenty thousand dollars in cash, the whole to be completed by the 1st day of March, 1871, and the mill in perfect working order. By those familiar with the mine and mill, we are informed that this can easily be accomplished within the time specified, and the mill at work crushing rock. We look upon this as one of the most important events to our country that has transpired, as the late owners were not in a position to further prosecute work upon these mines, which are admitted by all to be immensely rich in gold, and the present purchasers are amply able to open and work the mines in such shape as their richness would warrant.

Wisconsin.

REVIEW OF THE FOX RIVER IRON FURNACE.

The FOX River Iron Furnace, West Depere, BLANCHARD & ARNOLD, proprietors, has, says the Marquette *Mining Journal*, Jan. 7th, been in blast about six months, and from present appearance will run four months longer. They are making about twenty tons per day, nearly all No. 1 foundry iron. C. H. LOVELACE, superintendent and founder. The First National Furnace, East Depere, "blew out" December 24th, for a new hearth, after running ten and a half months, making 5350 tons—ninety per cent. being No. 1 foundry iron. Their repairs will be completed in about three weeks. The Green Bay Furnace, on the east banks of East river, at Green Bay, Wisconsin, is still running. This company has no coal kilns, and depend entirely on pit coal. The roads have been so bad of late, that enough coal to run the furnace could not be drawn in. Mr. WILLIAMS, superintendent, has advanced a comparatively new idea in the manufacture of iron. He uses seasoned hard wood sawed and split in small blocks with an equal amount of coal, their make averaging about ten tons a day. If the manufacture of pig iron can be carried on economically and successfully, by this process, this furnace will have added materially to the iron manufacturing interest. The Appleton Furnace located on the island at Appleton, Wis., is nearly completed. This work was commenced last spring, by Messrs. CLARK & DONKERSLEY, of Marquette, the stack is similar to the Bituminous and Anthracite furnaces of the east. being built of light boiler plate, with fire-brick lining, the stack resting on four columns of mason work. The plans of the buildings are unique and compact. The stack is painted red and we understand it will be hereafter known as the Red Jacket furnace—this furnace will probably blow in, about the 1st of March; the company have thirteen 45-cord brick kilns of the common beehive form and are now stocking coal. HON. C. J. LILLYER'S furnace of Fon du Lac, is progressing towards completion. The general plans of the furnace are similar to that of the First National, of Depere, but of somewhat larger dimensions throughout. It is conceived by those conversant with furnaces to be the most complete charcoal furnace in the United States. The building being all made of substantial stone-work, is therefore rendered more durable and safer than many of the present structures used for that purpose. This work is under the immediate supervision of J. C. CAMERON, builder of the two Depere furnaces and formerly of Lake Superior. The company are busily engaged in getting in their year's stock of wood, which adds materially to the industry of the district.

Canada.

NORTH SHORE SILVER MINES.

The Houghton (Mich.) *Mining Gazette*, January 5, says:—"Our latest dates from the mines on Silver Island are up to the 2d of December, reminding us very much of old times on Lake Superior, when we considered a date forty-five days old, fresh, crisp and warm. Our advices, at that time, report that everything and everybody connected with the Frue colony were in good condition, and settling down to a course of work which, if carried on until spring, will determine the value of the silver deposit on the Island. The last shipment of silver ore consisted of sixteen barrels, and was taken out, our report says, in six hours, by twenty-eight men. The pit on the course of the lode was down, on the 2d of December, about 18 feet below the level of the lake, and the "show" on the bottom was said to be good. The tug Hattie Vinton, which left this port on the 4th of November, for Silver Island, having in tow a raft of timber, had not put in an appearance up to the 2d of December."

Michigan.

LAKE SUPERIOR COPPER AND IRON.

The product of copper from the mines of Lake Superior, for the year ending December 1, 1870, according to the Houghton *Gazette*, has been in excess of that of any other year since mining operations were commenced. The mines in the Portage Lake district, that have suspended or fallen off in their products, have been more than overbalanced by the enormous and steady yield of the Hecla Calumet, while the product of copper for the past year at the Quincy mine, if anything, is larger than that of the year previous, so that the diminution in yield at the Franklin, Pewabic, Huron, South Pewabic, Shelden, Columbian, Portage and Isle Royal will in no way affect the grand total of shipments for the last year from Portage Lake; but, on the contrary, the figures show that several hundred tons more of copper were shipped than there was for the year ending December 1, 1869. The product of copper for the year ending December 1, 1870, in Keweenaw county, is but a few tons less than it was the year previous. There has been a slight falling off in the product of copper in Ontonagan county as compared with the figures of last year. Below we give the total shipments of ingot copper and mineral from all the mines of Lake Superior for the past year.

RECAPITULATION.

	Tons.	lbs.
Ingot copper shipped from Portage Lake	7456	1502
Mineral shipped from Portage Lake	3307	2275
Mineral shipped from Eagle River	1224	414
Mineral shipped from Eagle Harbor	1378	
Mineral shipped from Ontonagon	824	
Total ingot copper and mineral	14,189	3191

DETAILED STATEMENT OF REFINED COPPER AND MINERAL SHIPPED IN 1870 FROM PORTAGE LAKE.

	Mineral.	Refined.
Hecla Mining Co	2,446,755	6,822,176
Calumet Mining Co	1,198,235	4,080,413
Quincy Mining Co	2,954,742	
Schoolcraft Mining Co	15,467	384,290
Pewabic Mining Co		446,006
Franklin Mining Co		912,460
†John Uren		504,200
South Pewabic Copper Co. }		873,272
R. Shelden, Trustee }		177,308
Huron Copper Mining Co		433,556
*Doniel Dunn		33,400
Hancock Mining Co		156,600
Grand Portage Copper Co		2,647
*Daniel Northey & Co		33,200
*Philip Tucker	2,076	10,564
*Joseph Jedkins		5,613
Union Steamboat Co		908
*Edward Champion		10,917
*J. H. Pierce & Co		8,971
*Wm. Hitchings		1,844
*Williams & Gottstein		3,253
*Davy & Matthews		3,941
Huron Mine, from Tributers		5,245
South Pewabic "		2,661
Totals	6,615,275	14,9 3,502
Total shipments	21,528,777 lbs., or 10,764 tons.	

†Tributer Franklin-Pewabic. *Tributers.

The following table shows the ore and pig-iron shipments from the ports of Escanaba and Marquette for the season. They show an increase over those of last year of forty per cent., a fact which speaks for itself. The figures given are all net tons:

ESCANABA SHIPMENTS.	Tons.
Total iron ore	451,385
Total pig iron	15,203
MARQUETTE SHIPMETNS.	
Total iron ore	423,197
Total pig iron	30,529
GRAND TOTAL, ORE AND PIG IRON.	
Escanaba	466,588
Marquette	453,756
Total	929,344

Nevada.

SEVIER AND STAR MINING DISTRICTS.

A gentleman, just in from a twenty-five days' trip in the Sevier and Star mining districts, gives the following information in the *Reveille*: "The Star district is a little south of west of Beaver, and almost due west of Minersville, fifteen miles. Its prospects are good, and many ledges in the districts show very fine ore on the surface. But very little development has yet been made, from the fact that the miners there have been engaged in working up their assessments to preserve their locations. The ores are argentiferous galena and chloride ore. The country shows a general lime formation. The leads seem to be abundant and close together; and there are a number of true quartz lodes that can be traced in some instances three-quarters of a mile in length. Sevier district is on the east side of the Sevier range. The mines are located on Pine gulch, near Bullion City, the county seat of Piute. There are many large ledges there of silver-bearing rock, some of them prospecting from $15 to $20 in gold. The lodes are large and well-defined, containing a great deal of ore, but it is generally low-grade, carrying more or less base metal with it, such as gelena, nickel, cobalt, etc. There are about thirty men working in the Sevier District; and from twenty to thirty men in the Star district."

TEM PIUTE DISTRICT.

The White Pine *News*, January 12, has the following information on the condition of affairs in Tem Piute, from O. C. ROGERS, who has been on a business visit to this city: "The general prospect is very fair, and great confidence is felt by the mine owners. The McKenzie claim is managed by Judge THOMPSON, who has about 150 tons of first-class ore out, and is going on with work. The opening from which ore has been taken during the past season is an open cut, near forty feet wide, and now in about fifty feet. The ore on the dump assays from $100 to $300. A tunnel will be started in from this open cut, and work will go on without hindrance by weather. The Monroe is sinking an incline; has a ledge of twelve to fifteen feet width, with a pay-streak of three feet. Has twenty tons of ore out, of a quality similar to that of the McKenzie. The Amazon is tested from an open cut. The ore is about the same as in the above-mentioned. It is easily worked, two men taking out a ton and a half in a day. The Rattler shows a high grade of ore, and Judge THOMPSON will shortly commence work to open it. MCMURRAY is working the Incas and Santa Cruz. All owners of mines are confidently at work, satisfied that at an early day they will be able to make a showing of ore on the dumps sufficient to induce the erection of a mill to work the supply of ore believed to exist in the mountain. At present no mill can be reached. The Cresent mill is expected to be ready to start up about the 1st of Febuary. This is a 10-stamp mill, situated 15 miles from the Tem Piute mines, in the direction of Pahranagat. At Ticapoo springs, only eight miles from the mines, enough water flows to drive a 20-stamp mill; and in the vicinity is a plenty of wood—cedar and nut pine. Tem Piute is about a hundred miles from Hamilton, or 140 miles as traveled—the direction being almost due south—4 miles west. The road from Hamilton goes by Currant Creek and Blue Eagle Ranch, down the valley.

THE PIOCHE MINES.

Ham Light, just in from Pioche, gives the Virginia *Enterprise* the following information: "The Meadow Valley Mining Company are crushing about 1400 tons per month, which yields them from $160,000 to $180,000. Their mill contains thirty stamps and is kept in constant operation. When they first opened the mine they supposed that the ore could only be reduced by smelting, and built furnaces at a cost of between $50,000 and $60,000, when they accidently made the discovery that their ore could be worked by common mill process, when they put up the mill they are now running and have made no use of their furnaces. LIGHT has purchased a farm, upon which are two large springs, and is making arrangements to conduct the water into Pioche for milling purposes."

MARKET REVIEW.

The Coal Trade.

NEW YORK, Feb. 3, 1871.

WHOLESALE.—The stock of coal on hand in this market is from 15,000 to 18,000 tons. A majority of this is in large sizes. The state of trade generally is very unsatisfactory, in consequence of numerous rumors that pervade the market regarding the present suspension. Parties that have coal on hand do not know whether to sell at present prices or hold for an advance. Should affairs take such a turn that the operators and miners become entangled in a controversy that might take months to unravel, it would be actually locking up the entire coal production. There was a secret meeting of the Miners' Association on Tuesday last, at which (so it has leaked out) the men arranged a certain basis which they propose to submit to the operators. On the other hand, there has been a conclave of the Grand Moguls of the large companies and leading transportation companies in this city to-day, the nature of which we understand to be, that they *don't want any proposals of any kind* from the Miners' Association, but intend to combine and fight for the control of their millions invested, "if it takes all summer."

Our readers will recollect that this suspension was inaugurated by the men; the large companies reduced rates of labor in consequence of a decline in prices, and the men resolved to quit work, and suspended accordingly. Now, then, it is a very easy matter to have this suspension grow into a full-fledged strike. Old issues may easily be brought up, such as, Who shall hold the power or mastery, the men that work the mines, or the owners of them? etc., etc. Should this be the case, and the air smells strongly of it to-day, there are chances for a "long and tedious strike," and, of course, the price of coal will be greatly enhanced by it.

One of the rumors in the market to-day, is that "some of the men will resume on the 15th inst.," but as there seems to be no reason why they should, we put no faith in it. The past week is the first that any attempt has been made, of any kind, to bring the contending parties within speaking distance even, and already, as we note above, there seem to be difficulties arising. Now, then, it is fair to suppose that during the discussion some further obstacle will come up, which may be either real or apparent. In either case, much time will be spent in arbitration. Two or three weeks is little enough time to allow for a controversy of this kind, as all will admit. Then to get the men back to the mines, get the machinery in running order, and to set in motion the necessary cars for the transportation of large quantities of coal to tide-water, will occupy two or three weeks longer; so, in our opinion, putting the best face possible in the whole matter, *six weeks* is the shortest time we can expect any supply of coal that will directly affect this market. About the first of January, we stated that the suspension would be of about two months' duration, which would have taken us to March 1st, but as the intervening time has not been made use of, and new features have since developed themselves, we shall have to add three weeks' grace to our estimate. Now, then, our readers can certainly judge about what will be the price of coal six weeks from now, taking as a basis the advance during the past month, and the small stock on hand.

PRICES.—The rates for coal to-day, at wholesale, are—Lump, $6 50 to $7 00; Grate and Egg, $7 00 to $7 50; Stove, $8 50 alone, $8 00 to $8 25 when when sold with one-third of other sizes. At retail, we learn of all kinds of rates. The Pittston Company are selling in this city at $7 00 for Stove, $6 00 Egg and Grate, $5 50 Chestnut. In Brooklyn, the same rates except for Stove, which they sell at $6 50. The other companies ask about $1 higher all around, while the dealers generally ask $8 00 for the larger sizes, and $9 50 and even $10 00 for Stove. We cannot offer any explanation of why the Pittston Company sell coal lower than it can be purchased. They claim that they have only a small stock on hand, and do not think it necessary to advance on it. Their whole stock of Stove size in both cities is about 600 tons.

FREIGHTS.—There is so little coal moving that we hardly think it necessary to make quotations. Amboy is quoted at from 50 to 60c; Hoboken, Port Johnston and Weehawken, 40 to 45c.

Anthracite Coal Trade for 1870 and 1871.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending Jan. 28, 1871, compared with week ending Jan. 29, 1870.

COMPANIES.	1870. WEEK.	1870. TOTAL.	1871. WEEK.	1871. TOTAL.
*Phila & Reading R.R.	45,874	321,338	4,280	516,312
†Schuylkill Canal	....	34 373	....	36,225
Lehigh Valley R. R.	40,521	306,781	531	381,972
Lehigh & Sus. R. R.	25,456	79,161	947	55,094
†Lehigh Canal	....	....	....	....
Scranton North	11,787	48,873	....	....
" South	36,377	124,528	....	....
Penn. Coal Co., rail	17,637	68,745	256	2,639
" " " canal	....	....	....	....
Del. & Hud. Canal Co.	....	....	....	....
" " East	10,898	43,999	5,49	36,583
" " West	3,040	9,647	2,66	10,106
South	3,446	8,737	....	....
Shamokin	4,540	20,617	....	25,005
Trevorton	....	1,781	....	....
Lykens Valley Coal Co.	....	....	....	4,777
Wyoming South	....	....	....	....
Wyoming North	....	....	....	....
P. N. Y. C. & R. R. Co.	5,860	32,221	....	32,182
Williamstown, Col'y	2,403	3,639	....	17,847
Big Lick Col	....	....	....	5,094
Total	207,581	1,194,442	15,242	1,073 776
1870	15,242	1,073,776		
Increase week and yea	192,639	120,6.6		

* Less coal transported for Company's use and Bituminous coal.
†Closed for the season.

Bituminous Coal Trade, 1870 and 1871.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending Jan. 28, 1871, compared with week ending Jan. 29, 1870.

COMPANIES.	1870. Week.	1870. Year.	1871. Week.	1871. Year.
B. & O. R. R.	1,967	4,635	12,235	57,746
C. & O. Canal				
H & B. T. R. R.	2.120	10,594		11,700
Harrisburg & D.	4,213	53,174	5,144	31,825
L. V. R. R.		2,559	1,024	2,639
P. & N.Y. C. & R. Co.	2,625	28,306		

ncrease

Report of Coal Transported by the Lehigh Coal and Nav. Co.'s Railroads and Canals,

Week ending January 28, 1871—Compared with same time last year.

WHERE SHIPPED FROM	WEEK, 1871. tons cwt.	WEEK 1870. tons cwt.	YEAR, 1871 tons cwt.	YEAR 1870. tons cwt.
Wyoming Region	655 01	20440 09	37776 05	58659 03
Upper Lehigh Region		807 18	4614 06	2557 19
Mahanoy Region				
Hazleton Region		55 01	704 05	418 14
Beaver Meadow Region			1043 03	
Treeckow Region				
Mauch Chunk Region	292 12	4629 00	14363 00	20267 11
Totals	947 13	25932 09	58502 19	81903 07
Increase			23430 08	
Decrease	24984 15			
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	917 13	25486 00	55094 02	79161 17
Forwarded East of Mch Chunk by Canal				
Delivered at and above Mauch Chunk		374 03	3409 17	2173 10
Delivered to L. & B. R. R. at Plymouth Bridge		72 05		568 00
L. V. R. R. at Sugar N.				
Totals	947 13	25932 08	58502 19	81903 07
Of the above there was transported on acc'nt of L. C. & N. Co.	292 12	5179 10	15601 07	23776 18
W.-B. C. & I. Co.	319 06	8212 14	30568 03	26785 00
Totals	611 18	13392 04	46169 10	50561 18
Increase				
Decrease	12780 06		4392 08	

Philadelphia and Reading R. R.

Amount of coal transported on the Philadelphia and Reading Railrodad, Saturday, Jan. 28 1871;

From St. Clair	
" Port Carbon	192 04
" Pottsville	12 18
" Schuylkill Haven	661 07
" Auburn	1,071 10
" Port Clinton	2,342 19
" Allentown and Alburtis,	
" Harrisburg and Dauphin	5,144 09
Total paying freight	9,425 07
Coal for Company s use	487 06
Total for week	9.912 13
Previously this year	464,972 04
Total	474,884 17
To same time last year	432,379 13

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, January 28, 1871.

	Total for Week.	Corresponding week last Year.	Increase.
Passing over Main Line and Leb. Val Branch	4,740 13	41,763 09	
For Shipment by Canal	—	—	
Shipped Westward via Northern Central R. R.	740 17	2,993 11	
Shipped West or South from Pine Grove	349 14	912 00	
Consumed on Laterals	730 03	1,548 16	—
Lehigh and Wyoming Coal	86 13	11 06	75 07
Total Anthracite paying fr'gt	6,648 90	46,929 02	
Bituminous	4,361 00	2,401 16	1,959 04
Total of all kinds paying fr'gt	11,009 00	49,290 18	
Coal for Company's use	487 06	3,4.7 02	
Total Tonnage for Week	11 496 06	52,658 00	
Since Dec. 1, 1870	563 127 09	461.294 10	101,832 19
Total to date	574.623 15	513,952 10	60,671 05

SHIPPED BY CANAL.

	Total for Week.	Corresponding week last Year.	Increase.
From Schuylkill Haven	—	—	—
" Port Clinton	—	—	—
Total Tonnage per Week	—	—	—
Since Dec. 1, 1870	—	—	—
Total to date	36,225 17	34,373 16	1,852 01

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for the week ending January 28, 1871, and previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL Tons. Cwt.
Total Wyoming	242 07	64.243 16
" Hazleton	6 00	205.035 06
" Upper Lehigh		442 06
" Beaver Meadow	38 10	65.635 15
" Mahanoy	595 05	51,799 18
" Mauch Chunk		963 04
Total Anthracite	882 02	388,120 05
Bituminous Coal from all sources	1,024 00	2,639 00
Total by rail and canal	1,906 02	390,759 05
Same time last year	47,780 01	443,672 07
Increase		
Decrease	45,873 19	53,113 02
Forwarded East from M'h Chunk by rail	531 03	331,972 02
Same time last year	40,521 02	396,781 17
Increase		
Decrease	39,989 19	64.809 16

RECAPITULATION.

Forwarded East from M'h Chunk by rail	531 03	331,972 02
To N. C. R. R., at Mount Carmel		18 00
Forwarded North from L. & B. Junction	69 19	32,242 09
To L. & S. R. R. at Packerton for rail		1,837 02
Delivered at M'h Chunk		311 16
Delivered on line of road above Mauch Chunk		2,584 08
Delivered above M. Chunk for use of L. V. R. R.	281 00	9,567 17
To L. & S. R. R., at P'n Hav., for railroad		94 10
Do. for canal		7,060 19
At M. Chunk for canal		2,431 02
Total Anthracite	882 02	388,120 05
Bituminous Coal	1,024 00	2,639 00
Total all kinds	1,906 02	390,759 05

Pennsylvania Coal Company,

Shipments of Pittston Coal for the week ending January 28, 1871.

	1871. WEEK.	1871. YEAR.	1870. WEEK.	1870. YEAR.
By Railway	256 12	2,639 01	17,637 01	68,745 02
" Canal	— —	— —	— —	— —
Total	256 12	2,639 01	17,637 01	68,745 02
Decrease 66,106 01 tons.				

Delaware and Hudson Canal Company.

The following is a statement of Coal transported by the Delaware and Hudson Canal Co., for the week ending January 28, 1871.

	WEEK.	SEASON.
By Del. and Hud. Canal		
By Railroad East	5,499 00	36.583 00
" West	1,067 00	10,106 00
" South		
TOTAL TONS,	6,566 00	46,689 00
For the same period last year.		
By Del. and Hud. Canal		
By Railroad East	10,898 00	43.999 00
" West	3,049 00	9.647 00
" South	3,446 00	8.737 00
TOTAL TONS,	17,393 00	62,383 00

Shipments of Cumberland Coal

for the week ending Saturday, January 28, and for the year 1870:

SHIPPED BY	B. & O. R. R.	C. & O. CANAL.	TOTAL.
Cooke M	....	.....	.....
Borden	239 15	.....	.....
Consolidation	1,065 10	.....	.....
Spruce Hill	1,204 14	.....	.....
Midlothian	673 05	.....	.....
H. and Baltimore	....	.....	.....
do Va M	1,029 12	.....	.....
V C & I Co	899 18	.....	.....
G. C. C. and I	728 19	.....	.....
Maryland	612 02	.....	.....
American	899 10	.....	.....
Atlantic	758 03	.....	.....
Piedmont	666 10	.....	.....
Swanton	608 00	.....	.....
Barton	168 00	.....	.....
Potomac	893 00	.....	.....
Franklin	734 13	.....	.....
George's Creek M. C.	....	.....	.....
Big Vein	1,054 00	.....	.....
Total week	12,235 18	.....	12,235 18
Previous	45,510 14	.....	45,510 14
Total year	57,746 12	.....	57,746 12

Company Coals.

February, 1871.
No quotations during strike.

	L.	Str.	Gra.	Eg.	Sto.	Ches
Scranton at E. Port	— —	— —	— —	— —	— —	— —
Pittston at Weehawken	— —	— —	— —	— —	— —	— —
Lackawana at do	— —	— —	— —	— —	— —	— —
Wilk'b're at Hoboken	— —	— —	— —	— —	— —	— —
Old Co. Lehigh at Pt. Johnston	— —	— —	— —	— —	— —	— —
Lehigh at E. Port	— —	— —	— —	— —	— —	— —

For freights to different points, see "Freights."

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

	AT NEW YORK, February 4. R. A.	AT NEW YORK, February 4. W. A.	AT PHILADELPHIA. February 3. R. A.	AT PHILADELPHIA. February 3. W. A.
SCHUYLKILL.				
Lump	$— —	$— —	— —	— —
Steamer	— —	— —	— —	— —
Broken	— —	— —	— —	— to —
Egg	— to —	— to —	— —	— to —
Stove	— to —	— —	— —	— to —
Chestnut	— to —	— —	— —	— to —
Pea	— —	— —	— —	— —
LEHIGH.				
Lump, (along side)	— —	— —	— —	— —
Broken	— —	— —	— —	— —
Egg	— —	— —	— —	— —
Stove	— —	— —	— —	— —
Chestnut	— —	— —	— —	— —
Pea	— —	— —	— —	— —
SPECIAL COALS.*				
Diamond Vein	R. A. 6 00		— —	— —
New England	" —		— —	— —
Locust Dale	W. A. 5 50		— —	— —
Honey Brook, Le'h	W. A. 6 00 to 6 50		— —	— —
Spring Mountain	" 6 00 to 6 50		— —	— —
Sugar Creek	" 6 00 to 6 50		— —	— —
Sugar Loaf	" 6 00 to 6 50		— —	— —
Old Comp'y's	" 6 00 to 6 50		— —	— —
Cross Creek	" 6 00 to 6 50		— —	— —
Room Run	" "		— —	— —
Girardville	" "		— —	4 75
McMichael	" "		— —	4 75
Shamokin	" "	5 50	5 25	— —
Lykens Valley	" "	— —	5 75	— —
Broad Top	" "	5 50	— —	— —
Hill & Harris	" "	— —	4 75	— —
Henry Clay	" "	— —	5 00	— —
Powelton	" "	5 50	— —	4 75

[*Dealers in these coals may be found in our advertising columns.]

Prices for Coal at Mauch Chunk.

February 1871.

	F.L.	Bro.	Gra.	Eg.	Sto.	Chest.
Lehigh	$3 00	$3 75	$3 75	$3 75	$4 00	$3 00
Wilkesbarre	3 00	3 75	3 75	3 75	4 00	3 00

For freight to Elizabethport and to New York see "Freights."

BITUMINOUS COALS.

Kittaning Coal Co.'s Phœnix Vein, f.o.b. at Phila.	$5 00
Lemon " " "	4 75
Cumberland Vein Coal	4 75
Consolidation Coal Co.'s on board	N. Y. 7 00
Maryland Coal Co. "	7 00

Prices at Baltimore—February, 1871.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$5 80@— —
Pittston and Plymouth, do	5 60@5 75
Shamokin Red or White Ash, do	— —@6 00
Lykens Valley Red Ash, do	6 25@— —
Zerba Valley	5 25@— —
Treverton	6 00@— —
By retail, all kinds per ton of 2240 lbs.	7 25@8 25
Georges Creek & Cumberland f. o. b. at Locust Point for cargoes	4 60@4 75
Fairmont and Clarksburg gas, f. o. b. at L. Point	6 00@6 50

Prices at Georget'n, D.C., & Alexandria, Va.

February, 1871.

George's Creek and Cumberland f. o. b. for shipping $4 40

Prices at Havre de Grace, Md.

Wilkesbarre and other White Ash for cargoes	$— —@5 50
Lykens Valley	— —@6 25
Shamokin Red or White Ash	— —@5 75
Trevorton and Zerba Valley	— —@5 00

Prices of Gas Coals.

February, 1871.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr. 41-43 Pine st., N.Y.
Duty, $1 25, gold.

	Coarse.	Slack.
Block House	$1 75	@— 75
Gowrie	1 75	@— 75

Corrected by Bird, Perkins & Job, 86 South street.

	Coarse.	Culm of Coal.
Pictou	$2 25	@1 25
Sydney	2 25	@— 80
Lingan	1 75	@— 80
Little Glace Bay	1 75	@1 00
Caledonia	1 60	@— 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty $1 25 per ton, gold, on the coarse coal. 25 per cent. ad valorem on the Culm of Coal.

AMERICAN.

	Currency.	
Westmoreland	7 75	@8 00
Fairmount Gas Coal Co. of N. Y.	7 50	@— —
Despard Coal Co.	$7 50	@— —
Penn	7 75	@8 00
Newburg Orrel Gas	— —	@— —
West Fairmount Gas Coal	8 00	@— —
AT PHILADELPHIA.		
Powelton		$7 80

Prices of Foreign Coals.

February, 1871.

Duty $1 25 per ton.
Corrected weekly by PARMELE BROS., No 32 Pine street New York.

Liverpool Gas Caking	$ 9 00@— —
" " Cannel	11 50@12 00
" House	— —@16 00
" Orrel	12 00@14 00

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$16 00@17 00
" " Cannel, "	18 00@20 00

Per ton 2,000 lbs. delivered.

Foreign and Provincial Freights.

February, 1871.
Closed for the winter.

Foreign.	
Newcastle and Porte on Tyne, per keel of 21 1-5 tons	£14 00@£16 00
Liverpool, 5 per cent primage	13s @16. ton
TO NEW YORK.	
Provincial	
Sidney	$ —
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—
TO BOSTON.	
Sydney	$ —
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

Rates of Transportation to Tide Water.

Closed for the Season.
BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Port Carbon	$2 00
Less drawback of 50 cents on all Coal shipped east of New Brunswick and south of Cape Henry,	

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Easton	$ 84
C. R. R., N. J., Easton to Elizabethport	1 52
Shipping expenses at Elizabethport	25
Warfage	10
Total	$2 40

MAUCH CHUNK TO PORT JOHNSON.

L. V. R. R. or L. & S. R. R. from M. C. to Easton	$ 84
C. R. R., of N. J., Easton to Pt. Johnson	1 24
Shipping expenses	25
Warfage	10
Total	$2 43

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Easton	$ 84
Morris & Essex R. R. Easton to Hoboken	1 26
Shipping expenses	25
Warfage	10
Total	$2 45

TO SOUTH AMBOY.

L. V. R. R.	84
B. & D. R. R.	1 14
Cam. & Am. R. R.	
Shipping Expenses	25
Total	$2 23

PENN HAVEN TO ELIZABETHPORT.

L. V. RR. Penn Haven to Easton	84
C. RR. of N. J. Easton to Elizabethport	1 21
Shipping expenses	25
Wharfage	10
Total	$2 40

Freights.—February, 1871.

TO EASTERN PORTS.	From Philada.	From E Port and Port Johnston	From Keasbury	From Rondout
Amesbury	$2 50	$2 00		
Bangor	2 30	1 60		
Bath	2 30	1 75		
Boston	2 :0	1 85		
Bridgeport	1 75	1 00		
Bristol	2 00	1 40		
Cambridgeport	2 75	2 00		
Derby	2 00	1 20		
Dighton	2 50	— —		
East Cambridge	2 35	2 00		
Fall River	2 50	1 40		
Hackensack	1 75	1 00		
Hartford	2 50	1 50		
Jersey City	1 40	60		
Middletown	2 25	1 25		
Mystic	— —	1 25		
New Bedford	2 00	1 40		
Newburyport	2 65	1 85		
New Haven	1 80	1 00		
New London	1 76	1 25		
Newport	2 00	1 40		
New York	1 35	60		
Norwalk	1 80	1 00		
Norwich	2 00	1 40		
Patuxet	2 30	1 50		
Portland	2 30	1 50		
Portsmouth, N. H.	1 45	1 85		
Providence	2 00	1 25		
Rockport	2 10	1 65		
Saco	2 25	1 75		
Sag Harbor	1 70	1 20		
Salem	2 35	1 65		
Stamford	2 00	1 00		
Stonington	2 00	1 30		
Taunton	2 30	1 75		
Warren	— —	1 40		
Washington	1 25			
TO RIVER PORTS.				
Albany				
Catskill				
Cocksackie				
Coeyman's				
Cold Spring				
Fishkill				
Haverstraw				
Hudson				
New York				
Nyack				
Poughkeepsie				
Rhinebeck				
Rondout				
Saugerties				
Sing Sing				
Stuyvesant				
Tarrytown				
Troy				
West Point				
Yonkers				

METALS.

NEW YORK, February 8, 1871.

IRON.—Duty: Bars, 1 to 1¼ cents ₱ lb; Railroad, 70 cents ₱ 100 lbs.; Boiler and Plate, 1¼ cents ₱ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ₱ lb; Pig, 7 ₱ ton; Polished Sheet, 3cents ₱ lb; Galvanized 2½; Scrap Cast, $6; Wrought, 8 per ton,

	Store Prices.
Pig, Scotch No. 1, ₱ ton	30 00@34 00
Pig, American, No. 1	30 00@— —
Pig, American, No. 2	28 00@29 00
Pig, American, Forge	27 00@28 00
Bar, Refined, English and American	— —@75 00
Bar, Swedes, assorted sizes (gold)	85 00@100 00
	Store Prices, Cash.
Bar, Swedes, ord'y sizes, less 5 ₱ ct.	— —@110 00
Bar, Refined " "	74 00@ 79 00
Bar, Common " "	70 00@— —
Scroll " "	97 50@125 —
Ovals and half-round " "	97 50@125 —
Band " "	97 50@ 95 00
Horse Shoe " "	95 —@— —
Rods, ⅜ to 3-16 inch " "	82 50@— —
Hoop " "	102 50@140 00
Nail rod, less 5 ₱ ct.	6¼@— —
Sheet, Russia, as to Nos. (gold)	10½@—11
Sheet, Single, D. and T. Common	—4¾@— 6
Sheet, Galv'd, Nos. 14 to 26 10 and 12c. Nos. 27, 28, and 29, 13@14	
Rails, English (gold), ₱ ton	56 00 @58 00
Rails, American, at Works in Pa	70 00 @73 00

STEEL.—Duty: Bars and ingots, valued at 7 cents ₱ lb or under, 2¼ cents; over 7 cents and not above 11, 3 cents ₱ lb; over 11 cents, 3½ cents ₱ lb, and 10 ₱ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ₱ lb	— 15 @— 18
English Spring (2d and 1st quality)	— 7 @— 10
English Blister (2d and 1st quality)	— 10 @— 17
English Machinery	— 11½@— 14

English German (2d and 1st quality)	—	13	@— 15
American Blister "Black Diamond"	—	—	@— 12
American, Cast, Tool do.	—	16	@— 17
American, Spring, do.	—	9	@— 11
American Machinery, do.	—	—	@— 12
American German, do.	—	9	@— 12

COPPER.—Duty: Pig, Bar, and Ingot, 5 cents ℔ lb; Manufactured, 45 per cent. ad val. old Copper 20 cents ℔ lb.

	All Cash.	
Copper, New Sheathing, ℔ lb	—	@— 30
Copper Bolts	—	@— 32
Copper Braziers, 16oz. and over	—	@— 32
Copper Nails	—	@— 37
Copper, Old Sheathing, &c., clean	19	@— 20
Copper, Chili Pig	—	@—
Copper, American Ingot	22	@— 22¼
Yellow Metal, New Sheating	—	@— 22
Yellow Metal Bolts	24	@— —
Yellow Metal Nails	—	@— 22

LEAD.—Duty: Pig, $2 ℔ 100 lbs.; old Lead, 1½ cents ℔ lb; Pipe and Sheet, 2½ cents ℔ lb.

Galena, ℔ 100 lbs	$—	@—
Spanish (gold)	6 15	@6 25
German, do.	6 15	@6 25
English, do.	6 20	@6 50
Bar (net)	8 75	@—
Pipe (net)	10 25	@—
Sheet	10 25	@—

TIN.—Duty: Pig, Bars, and Blocks, 15 ℔ cent. ad val.: Plate and Sheets and Terne Plates, 25 ℔ cent.; Roofing 25 ad val.

	Gold ℔ lb.
Banca	39 @—
Straits	33½@34¼
English	33¾@—

PLATES.	Fair to Good Brands. Gold.	Currency.
I. C. Charcoal, ℔ box	$8 62½@8 72½	$9 75 @10 00
I. C. Coke	7 37½@7 75	8 37½@ 8 75
Coke Terne	6 25 @6 25	6 00 @ 8 00
Charcoal Terne	7 75 @8 25	8 75 @ 9 50

SPELTER.—Duty: In Pigs, Bars, and Plates, $1 50 ℔ lb.

	Gold.
Plates, Foreign ℔ 100 lbs.	$5 87½ 6 12½
Plates, Domestic ℔ lb.	8¼ 11½

REMARKS.

IRON.—The demand for Scotch Pig continues light, the trade purchasing only as their wants compel, and prices are in favor of buyers. An invoice of 100 tons Glengarnock sold to arrive at $31, and 150 do. on the spot on private terms. There has been an improved demand for American at quoted rates. Forge is in limited supply, and has advanced to $28 25, being a trifle higher than No. 2. The sales are 500 tons Lehigh Valley Forge at $28 25, 700 do. Thomas, 200 do. Crane, and 100 do. Saucon, on private terms. Old Rails have been in fair request, but new are inactive, closing steady, however, at previous quotations; 900 tons old Double Headed and T sold at private prices. Refined Bar from store is without improvement in demand or price, and could hardly be moved in the present state of the streets, if there were a demand.

LEAD.—Pig remains quiet, and prices are unchanged. We have only to notice sales of 50 tons soft German on private terms, and 30 do. Spanish, $6 30@6 37½ gold. There have been considerable arrivals, but most of the parcels were sold before, and consumers are consequently supplied. Bar, Pipe and Sheet are steady at the combination rates.

COPPER.—The manufactures of Copper and Yellow Metal are steady at our quoted rates. Ingot is still very quiet; the demand from manufacturers is light, and their limited wants are supplied by purchases of outside parcels at rates below those demanded by the large holders. The sales are 50,000 lb. Lake and 20 000 lb. Tennessee at 22¼ cents; and 25,000 lb. Quincy, 22⅛, cash; in addition to which small lots of Lake have been taken at 22¼@22⅜ cents.

STEEL.—Is steady at old rates.

SPELTER.—The demand for foreign is very limited; 25 tons Silesian sold at 5¼@6 cents, gold.

TIN.—The market for Pig has been unfavorably affected by the receipt of London telegrams advising a reduction in price of about £3, the quotations being for Straits £132, and English £134@135; prices here are consequently somewhat unsettled. The statistical position of the article is deemed good, and the large holders are not disposed to give way much, dealers offering in some instances to sell at prices below those asked by the principal holders. The sales are 250 slabs Straits at 33¼@ 34 cents, and 100 do. Malacca 34¼; English nominally 33¼, and Banca 39, all gold. Plates are in moderate demand, and are relatively better supported than Pig, so that quotations are unchanged. Sales have been made of 900 bxs. Charcoal Tin at $8 62½@8 75 for I. C.; 200 do. Coke Tin, 14 by 20, $7 62½, and 300 do. Charcoal Terne, $7 75, all gold.

ZINC.—We note a sale of 50 casks Mosselmann, to arrive, at 8 cents, less 4 per cent., gold. From store the market is very quiet at 8½@9 cents, currency; Am. Ox., 6½c.@7c.; French, 10c.@10½c., Sheet, 8½c.@9c.; Manganese, 4½c.@5e.

Petroleum.

We have but little change to note in Petroleum, if we may except "Home," which has considerably advanced. No sales are reported—"not one." Annexed is a comparative table of quotations for this and the week previous:

	BID.	ASKED
Bergen Coal and Oil	—	—
Bennehoff Run	—	5
Blood Farm	—	—
Breevoort	—	—
Bliven Oil	—	—
Buchanan Farm	35	—
Central	60	—
Clinton	—	—
Home	195	225
Phillips Pet	—	—
Rynd Farm	20	—
United Petroleum Farms	15	20
United States	—	80
National	—	—
New York & Allegheney	—	—
Northern Light	—	20
Pit ole Creek	60	90
Rathbone Oil	—	—
Second National	—	20
Sherman & B	—	50
Rynd Farm	—	19
Hoffman	5	8

Mining Stocks.

NEW YORK, Feb. 3, 1871.

No transactions in mining stocks are reported by the Board. Quotations are merely nominal. We should not probably feel the effect of the Board at all, were it not for a slight variation in the price of a few stocks, as shown in the following comparative table:

Savage	45¼
Yellow Jacket	41
Kentuck	33
Chollar Potosi	No sales.
Gould & Curry	45½
Belcher	9⅞
Imperial	6
Amador	303
Crown Point	—
Hale & Norcross	—

San FranciscoStock Market.

Our reports from the San Francisco Mining Stock Board, per telegraph, dates the 2d inst. We have not much change to note in quorations, in comparison with our report of last week. Amador has considerably advanced, compared with the report given two weeks ago. Below is a comparative table for this and the week previous:

	BID.	ASKED
Bates and Baxter	25	27
Benton	6	8
Black Hawk	23	40
Central Gold	9	15
Consolidated Gregory	24	40
Grass Valley	6	12
Gunnell	17	20
Smith and Parmelee	19	20
N. Y. & Eldora	20	—
Quartz Hill	10	15

The Slate Trade.

[Corrected weekly.]

(A "square" represents 100 superficial feet.)

PRICES OF ROOFING SLATE.

Vermont purple, 1st quality, per square		$6 50@	7 00
" green, 1st	" "	6 50@	7 00
" red, 1st	" "	15 00@16	00
" variegated,	" "	5 75@	6 20
Pa. b'k and d'k blue, 1st qual.,	"	6 00@	7 05

PENNSYLVANIA SLATE TRADE.

SHIPMENTS OF SLATE OVER THE LEHIGH VALLEY, AND LEHIGH AND SUSQUEHANNA R. R., AND THE LEHIGH CANAL:

For the week ending January 28, 1871.

LEHIGH VALLEY R. R.

ROOFING SLATE.

Girard Slate Co	105 squares.
Jones & Williams	70 "
D. Williams & Co	— "
Saylor & Morgan	— "
H. Williams	35 "
Lehigh Slate Co	— "
American Slate Co	— "
Hope	35 "
Keystone	35 "
Locke	— "
J. Anthony	— "
Kuntz & Woodning	— "
Columbia	35 "
Total	315 "

SCHOOL SLATES.

D. Williams	36 cases.
Lehigh Slate Co	— "
Locke Slate Co	25 "
H. Kuntz	4 "
Total	65 "

BLACK BOARDS.

Yerkes & Martin	18 "
Lehigh Slate Co	1 "
Total	19

MANTELS.

Yerkes & Martin	23 "
Lehigh Slate Co	26 "
Total	49 "

VERMONT SLATE TRADE.

REPORT of Slate Shipped from Middle Granville, N.Y., via the R. & S. R. R., for the week ending January 28. and for the year 1871.

ROOFING SLATE.

NO. OF SQUARES.	Week.	Prev'ly.	Year.
Penrhyn Slate Co	95	....	95
New York Slate Co	....	....	....
Middle Granville Slate Co	....	....	....
American Slate Co	....	....	....
Benj. Williams	65	70	135
Jones & Williams	....	....	....
Eagle Slate Co	....	....	....
H. W. Hughes	....	....	....
J. D. Jones	....	....	....
Total	—	—	—

MANTELS, &C.

NO. OF CASES.	Week.	Prev'ly.	Total.
Eagle Slate Co	....	....	....
Penrhyn Slate Co	152	266	418

MILL STOCK.

NO. OF CASES SHIPPED BY	Week.	Prev'ly	Total
Eagle Slate Co cars	..	2	
Penrhyn Slate Co "	—	—	—

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PROPOSALS FOR WORKING THE PETROLEUM MINES OF SANTA ELENA, IN THE REPUBLIC OF ECUADOR.

VICE-CONSULATE OF ECUADOR,
No. 7, Broadway,
New York, January 30th, 1871.

The Government of Ecuador will receive proposals for leasing the lately-discovered petroleum mines at Santa Elena, in that Republic, upon the following conditions:

The lease will be granted for a term of not less than ten and not exceeding fifty years, and the annual rental to be not less than $15,000 (four francs to the dollar), payable in advance, thirty days before the beginning of each year.

The lease will comprise only the mines of petroleum, and not those of coal, sulphur or salt.

All the machinery, implements, tools etc., for working said mines, and all the necessary building materials, will be admitted free of duty; the export duty on the petroleum and pitch will also be remitted.

The lease will terminate *ipso facto* on the non-payment of the annual stipulation, and the machinery, buildings, and all materials belonging thereto, will be forfeited to the Government.

The undersigned will receive proposals, addressed to the Government of Ecuador, until the 31st day of May, 1871, or the same may be forwarded direct to the Governor of Guayaquil.

The proposals will be opened on the 1st day of July, and the lease granted to the highest bidder, and the stipulated terms will take effect on the 25th of the same month.

The right is reserved on the part of the Government to reject any or all of the bids, if it be deemed for its interest to do so.

The mines are situated contiguous to the Pacific, and very near the port of Ballenita, where the steamers of the P. S. N. Co touch once a month.

The water wells are located at some distance from the mines.

The climate is exceedingly salubrious and healthy, and the mildness of its temperature renders it most desirable as a place of resort for invalids.

By order of his Excellency the Minister of Ecuador in the United States.

N. R. ANSADO,
Vice-Consul, Attache of the Legation.

REPORT OF THE GOVERNMENT ENGINEER.

To His Excellency the President of the Republic of Ecuador:

HONORABLE SIR: According to the instructions of your Excellency, I have been to Santa Elena, in order to survey the mines of petroleum, which for many years have been known to exist there, and I am happy to be able to express the opinion that that portion of the coast will certainly become a centre of importance for mines not only of petroleum, but also of sulphur, salt, iron and coal.

Petroleum is to be found in the country in very large quantities. On a surface of about four square leagues from the sulphurous springs of San Vicente to the sea shore, wells have been sunk and the bituminous matter obtained in a liquid state. Its consistence is not the same in the different wells. In some of them it is fluid, like whale oil, in others it has the consistence of butter at ordinary temperatures. At the upper part of many wells it can be seen in hard, compact masses, which probably have been formed by the evaporation of the liquid. This crude petroleum has a dark brownish color, which gets darker with the greater consistence of the oil. Only in one place, where it oozes from the bed of a dried stream, the bituminous matter has a greenish color.

Its smell is not disagreeable, which is generally the case with many of the American, and especially the Canadian oils. The olfactory nerves do not need a ninety-six hours' acquaintance with its odors to become insensible to them.

As the inhabitants have neither the knowledge nor the implements required, the works are very rude. Pits, from ten to twelve feet deep, are dug into the sand till clay is reached, and when the oil, which oozes from all sides, has filled them, it is dipped out.

Near the wells are primitive furnaces, built with sundried clay, on which are open iron boilers. The bituminous matter is thrown into these vases, and cooked until all the volatile products disappear, and leave a thick pitch.

It is generally admitted that petroleum has been produced by the slow distillation at low temperatures from coal and other bituminous minerals. It is also acknowledged that it is found oftener stored in the fissures in the rocks and most plentiful in those regions where the strata has been most disturbed, and where, as a consequence the largest number of fissures occur.

In the special case of Santa Elena, it is not admissible to suppose that petroleum has been formed in the upper sandy deposits. Its presence there can only be explained by the escape of the bituminous matter from the fissures in which it was contained under a powerful volcanic action, which, in certain places, has completely broken and disturbed the different strata. We may then perfectly admit that, although large quantities of oil are to be found in the sand, it is only the mere waste of the real springs.

Deeper sinking will, without any doubt, be very profitable and yield immense proportions of petroleum. For want of instruments I could not verify the fact and give material proof.

Their proximity to the sea is another advantage of these mines. While great difficulties have been encountered in the United States for the conveyance of the oil from the oil districts to the shipping ports, here it may be conducted at a very small expense, from the wells to the port of Santa Elena, by means of pipes, if the crude oil is exported. Although I should think that it would be more profitable to refine it at the place of production, but the advantage expressed remains the same.

By their extent, by the enormous quantity of petroleum that they contain, by the short distance which lies between them and the sea, these mines have a real value. Intelligent capitalists will promptly appreciate it, and works will soon be established.

By building refineries at Santa Elena enough kerosene might be produced for the use of the country and for the markets of the neighboring republics. I took with me some of the bituminous matter, which I shall analyze on my arrival at Quito, so as to know the proportion of the different matters contained in it. I shall have the honor of sending a special report to your Excellency upon the subject.

Having finished with the survey of the oil region, I went to the village of La Salina, where are established the salt pits. I also found there great wealth, but not developed.

Pits are dug in the sand, which are filled by the sea once a year, at the end of February, when it rises very high. When the water thus imprisoned in the pits is sufficiently condensed under the influence of the sun, the salt is deposited; but the workingmen do not collect it until the pits are completely dry. It would be preferable to collect it before, as the presence in the salt of sand and many other impure matters contained in solution by the water would be avoided. It would also be useful to send some cars for the transport of the salt.

As the surface of the ground thus covered by the sea once a year is very extensive, very many pits might be dug without great expense, and the production of salt largely increased.

Sulphur is to be found in abundance, but I do not think it possible to extract that mineral with profit, as the expense of transportation to the markets of Europe or the United States would be too great.

The hot springs of San Vicente, placed near a small volcano, contain sulphur and salt. There are several springs, having each a different temperature. One of the warmest has near the surface about 27° Reaumur. They might, perhaps, usually be employed in rheumatism and certain cutaneous diseases.

In all the neighboring places of Santa Elena limestone is to be seen, which will be very useful for building purposes.

Iron and coal seem also to exist in different places. As I could only make a superficial survey, I am not able to express any opinion upon the richness of the deposits, but I met large quantities of red and brown peroxydes of iron near the surface.

As regards coal, I have also seen evident signs of its existence. Not only a large portion of the country belongs to the carboniferous system, presenting sandstone, caldy limestone, shale, etc., but at the top of a mountain at about five leagues from Colonches I discovered veins a quarter of an inch thick.

Very likely thicker beds would be found by sinking a shaft; but unfortunately to work at that point would present such difficulties as to render the price of coal obtained too high.

I am, however, perfectly satisfied that the sinking of shafts, intelligently directed, will show the presence of coal in more accessible places.

I end, honorable sir, this report, with the strong conviction that the port on of the country that I have had the honor of surveying, although arid, will be found rich in minerals.

Begging your Excellency to accept the assurance of my respect and my devotion, I remain, honorable sir, your very obedient servant,

RAYMOND DE PEIGER, Engineer.

OFFICE OF THE NEW YORK CITY OIL CO.,
No. 116 Maiden Lane,
NEW YORK, Jan. 16th, 1871.

N. R. Ansado, Esq., Attachee Legation of Ecuador:

DEAR SIR,—The sample of crude petroleum submitted to me for analysis, samples of products of Ecuador, I find to correspond to samples that I have examined from Utah, Colorado and Mexico. We call such oil "surface oil," since it has come in contact with the atmosphere, and lost by evaporation all of its paphtha, and most of its kerosene or burning oil.

It yields no naphtha	0.00
" " kerosene, or burning oil, per cent	0.15
Parafine lubricating oil	0 40
Water and ammonia	0.10
Petroleum tar, similar to asphaltum and coke	0 35
	1.00

In the New York market, at present, parafine lubricating oil is worth more than kerosene or burning oil.

Pennsylvania petroleum, taken from 400 to 800 feet below the surface of the earth, yields—

Incondensible gas, about	0.05
Naphtha	0.15
Burning, or kerosene oil	0.65
Parafine, or lubricating oil	0.95
Tar, coke, &c	0.10
	1 00

By sinking wells into the earth where the geological structure warrants, petroleum similar to the Pennsylvania petroleum has been found where "surface oil" like the sample has been found. Yours truly,

E. G. KELLEY, Chemist,
Feb. 7, 1t. 116 Maiden lane, N. Y.

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MARKET REVIEW.

The Coal Trade.

NEW YORK, Feb. 3, 1871.

WHOLESALE.—The stock of coal on hand in this market is from 15,000 to 18,000 tons. A majority of this is in large sizes. The state of trade generally is very unsatisfactory, in consequence of numerous rumors that pervade the market regarding the present suspension. Parties that have coal on hand do not know whether to sell at present prices or hold for an advance. Should affairs take such a turn that the operators and miners become entangled in a controversy that might take months to unravel, it would be actually locking up the entire coal production. There was a secret meeting of the Miners' Association on Tuesday last, at which (so it has leaked out) the men arranged a certain basis which they propose to submit to the operators. On the other hand, there has been a conclave of the Grand Moguls of the large companies and leading transportation companies in this city to-day, the nature of which we understand to be, that they *don't want any proposals of any kind* from the Miners' Association, but intend to combine and fight for the control of their millions invested, "if it takes all summer."

Our readers will recollect that this suspension was inaugurated by the men; the large companies reduced rates of labor in consequence of a decline in prices, and the men resolved to quit work, and suspended accordingly. Now, then, it is a very easy matter to have this suspension grow into a full-fledged strike. Old issues may easily be brought up, such as, Who shall hold the power or mastery, the men that work the mines, or the owners of them? etc., etc. Should this be the ease, and the air smells strongly of it to-day, there are chances for a "long and tedious strike," and, of course, the price of coal will be greatly enhanced by it.

One of the rumors in the market to-day, is that "some of the men will resume on the 15th inst.," but as there seems to be no reason why they should, we put no faith in it. The past week is the first that any attempt has been made, of any kind, to bring the contending parties within speaking distance even, and already, as we note above, there seem to be difficulties arising. Now, then, it is fair to suppose that during the discussion some further obstacle will come up, which may be either real or apparent. In either case, much time will be spent in arbitration. Two or three weeks is little enough time to allow for a controversy of this kind, as all will admit. Then to get the men back to the mines, get the machinery in running order, and to set in motion the necessary cars for the transportation of large quantities of coal to tide-water, will occupy two or three weeks longer; so, in our opinion, putting the best face possible in the whole matter, *six weeks* is the shortest time we can expect any supply of coal that will directly affect this market. About the first of January, we stated that the suspension would be of about two months' duration, which would have taken us to March 1st, but as the intervening time has not been made use of, and new features have since developed themselves, we shall have to add three weeks' grace to our estimate. Now, then, our readers can certainly judge about what will be the price of coal six weeks from now, taking as a basis the advance during the past month, and the small stock on hand.

PRICES—The rates for coal to-day, at wholesale, are—Lump, $6 50 to $7 00; Grate and Egg, $7 00 to $7 50; Stove, $8 50 alone, $8 00 to $8 25 when when sold with one-third of other sizes. At retail, we learn of all kinds of rates. The Pittston Company are selling in this city at $7 00 for Stove, $6 00 Egg and Grate, $5 50 Chestnut. In Brooklyn, the same rates except for Stove, which they sell at $6 50. The other companies ask about $1 higher all around, while the dealers generally ask $8 00 for the larger sizes, and $9 50 and even $10 00 for Stove. We cannot offer any explanation of why the Pittston Company sell coal lower than it can be purchased. They claim that they have only a small stock on hand, and do not think it necessary to advance on it. Their whole stock of Stove size in both cities is about 600 tons.

FREIGHTS.—There is so little coal moving that we hardly think it necessary to make quotations. Amboy is quoted at from 50 to 60c; Hoboken, Port Johnston and Weehawken, 40 to 45c.

Anthracite Coal Trade for 1870 and 1871.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending Jan. 28, 1871, compared with week ending Jan. 29, 1870.

COMPANIES.	1870. WEEK.	1870. TOTAL.	1871. WEEK.	1871. TOTAL.
*Phila & Reading R. R.	45,874	321,338	4,280	516,312
†Schuylkill Canal	....	24,373	....	36,225
Lehigh Valley R. R.	40,521	396,781	531	331,972
Lehigh & Sus. R. R.	25,486	79,161	947	55,094
Lehigh Canal	....	....	....	.....
Scranton North	11,787	48,873	....	.....
" South	36,377	124,528	....	.....
Penn. Coal Co., rail	17,637	68,745	256	2,639
" " canal	....	....	....	....
Del. & Hud. Canal Co.	....	....	....	....
" " East	10,898	43,899	5,49	36,583
" " West	3,040	9,647	2,66	10,106
South	3,446	8,737	....	....
Shamokin	4,540	20,617	....	25,005
Trevorton	....	1,781	....	....
Lykens Valley Coal Co.	....	....	....	4,777
Wyoming South	....	....	....	....
Wyoming North	....	....	....	....
F. N. V. C. & R. R. Co.	5,880	32,221	....	32,182
Williamstown, Col'y	2,403	3,639	....	17,847
Big Lick Col	....	....	....	5,034
Total	207,581	1,194,442	15,242	1,073 776
1870	15,242	1,073,776		
Increase week and year	192,639	120,6.6		

* Less coal transported for Company's use and Bituminous coal.
†Closed for the season.

Bituminous Coal Trade, 1870 and 1871.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending Jan. 28, 1871, compared with week ending Jan. 29, 1870.

COMPANIES.	1870. Week.	1870. Year.	1871. Week.	1871. Year.
B. & O. R. R.	1,967	4,635	12,235	57,746
C. & O. Canal	....	....	....	....
H & B. T. R. R.	2.120	10,594	....	11,700
Harrisburg & D.	4,213	53,174	5,144	51,825
L. V. R. R.	....	2,559	1,024	2,639
P. & N. Y. C. & R. Co.	2,625	28,306	....	....

ncrease

Report of Coal Transported by the Lehigh Coal and Nav. Co.'s Railroads and Canals,

Week ending January 28, 1871—Compared with same time last year.

WHERE SHIPPED FROM	WEEK, 1871. tons ct	WEEK 1870. tons ct.	YEAR, 1871 tons cwt.	YEAR 1870. tons cwt.
Wyoming Region	655 01	20440 09	37726 05	58659 03
Upper Lehigh Region		807 18	4614 06	2657 19
Mahanoy Region		55 01	704 05	418 14
Hazleton Region				
Beaver Meadow Region			1043 03	
Tresckow Region			1463 00	
Mauch Chunk Region	292 12	4629 00		20267 11
Totals	947 13	25932 09	85502 19	81903 07
Increase			23430 08	
Decrease	24984 15			
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	917 13	25486 00	55094 02	79161 17
Forwarded East of Mch Chunk by Canal				
Delivered at and above Mauch Chunk		374 03	3409 17	2173 10
Delivered to L. & B. R. R. at Plymouth Bridge		72 05		568 00
L. V. R. R. at Sugar N.				
Totals	947 13	25932 08	58502 19	81903 07
Of the above there was transported on acc'nt of L. C. & N. Co.	292 12	5179 10	15601 07	23776 18
W.-B. C. & I. Co.	319 06	8212 14	30568 03	26785 00
Totals	611 18	13392 04	46169 10	50561 18
Increase				
Decrease	12780 06		4392 08	

Philadelphia and Reading R. R.

Amount of coal transported on the Philadelphia and Reading Railrodad, Saturday, Jan. 28 1871;

From St. Clair	
" Port Carbon	192 04
" Pottsville	12 18
" Schuylkill Haven	661 07
" Auburn	1,071 10
" Port Clinton	2,342 19
" Allentown and Alburtis	
" Harrisburg and Dauphin	5,144 09
Total paying freight	9,425 07
Coal for Company s use	487 06
Total for week	9,912 13
Previously this year	464,972 04
Total	474,884 17
To same time last year	432,379 13

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, January 28, 1871.

	Total for Week.	Corresponding week last Year.	Increase.
Passing over Main Line and Leb. Val Branch	4,740 13	41,763 09	
For Shipment by Canal	—	—	
Shipped Westward via Northern Central R. R.	740 17	2,993 11	
Shipped West or South from Pine Grove	349 14	812 00	
Consumed on Laterals	730 03	1,548 16	—
Lehigh and Wyoming Coal	86 13	11 08	75 07
Total Anthracite paying fr'gt	6,648 00	46,829 02	
Bituminous	4,361 00	2,401 16	1,959 04
Total of all kinds paying fr'gt	11,009 00	49,230 18	
Coal for Company's use	487 06	3,4.7 12	
Total Tonnage for Week	11 496 06	52,658 00	
Since Dec. 1, 1870	563 127 09	461.294 10	101,832 19
Total to date	574.623 15	513,952 10	60,671 05

SHIPPED BY CANAL.

	Total for Week.	Corresponding week last Year.	Increase.
From Schuylkill Haven	—	—	—
" Port Clinton	—	—	—
Total Tonnage per Week	—		—
Since Dec. 1, 1870	—		—
Total to date	36,225 17	34,373 16	1,852 01

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for the week ending January 28, 1871, and previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL Tons. Cwt.
Total Wyoming	242 07	64,243 16
" Hazleton	6 00	205,035 06
" Upper Lehigh		442 06
" Beaver Meadow	38 10	65,625 15
" Mahanoy	595 05	51,799 18
" Mauch Chunk		963 04
Total Anthracite	882 02	388,120 05
Bituminous Coal from all sources	1,024 00	2,639 00
Total by rail and canal	1,906 02	390,759 05
Same time last year	47,780 01	443,872 07
Increase		
Decrease	45,873 19	53,113 02
Forwarded East from M'h Chunk by rail	531 03	331,972 02
Same time last year	40,521 02	396,781 17
Increase		
Decrease	39,989 19	64,809 16

RECAPITULATION.

Forwarded East from M'h Chunk by rail	531 03	331,972 02
To N. C. R. R., at Mount Carmel		18 00
Forwarded North from L. & B. Junction	89 19	32,242 09
To L. & S. R. R. at Packerton for rail		1,837 02
Delivered at M'h Chunk		311 16
Delivered on line of road above Mauch Chunk		2,564 08
Delivered above M. Chunk for use of L. V. R. R.	281 00	9,567 17
To L. & S. R. R., at P'n Hav., for railroad		94 10
Do. for canal		7,069 19
At M. Chunk for canal		2,431 02
Total Anthracite	882 02	388,120 05
Bituminous Coal	1,024 00	2,639 00
Total all kinds	1,906 02	390,759 05

Pennsylvania Coal Company.

Shipments of Pittston Coal for the week ending January 28, 1871.

	1871. WEEK.	1871. YEAR.	1870. WEEK.	1870. YEAR.
By Railway	256 12	2,639 01	17,637 01	68.745 02
" Canal	— —	— —	— —	— —
Total	256 12	2,639 01	17,637 01	68,745 02

Decrease 66,106 01 tons.

Delaware and Hudson Canal Company.

The following is a statement of Coal transported by the Delaware and Hudson Canal Co., for the week ending January 28, 1871.

	WEEK.	SEASON.
By Del. and Hud. Canal		
By Railroad East	5,499 00	36,583 00
" West	1,067 00	10,106 00
" South		
TOTAL TONS,	6,566 00	46,689 00
For the same period last year.		
By Del. and Hud. Canal		
By Railroad East	10,898 00	43,999 00
" West	3,049 00	9,647 00
" South	3,446 00	8,737 00
TOTAL TONS,	17,393 00	62,383 10

Shipments of Cumberland Coal

for the week ending Saturday, January 28, and for the year 1870:

SHIPPED BY	B. & O. R. R.	C. & O. CANAL.	TOTAL.
Cooke M	.....	.....	.....
Borden	239 15	.....	.....
Consolidation	1,065 10	.....	.....
Spruce Hill	1,204 14	.....	.....
Midlothian	673 05	.....	.....
H. and Baltimore	.....	.....	.....
do Va M	1,029 12	.....	.....
V C & I Co	899 18	.....	.....
G. C. C. and I	728 19	.....	.....
Maryland	612 02	.....	.....
American	899 10	.....	.....
Atlantic	758 03	.....	.....
Piedmont	666 10	.....	.....
Swanton	608 00	.....	.....
Barton	168 00	.....	.....
Potomac	893 00	.....	.....
Franklin	734 13	.....	.....
George's Creek M. C.	.....	.....	.....
Big Vein	1,054 00	.....	.....
Total week	12,235 18	.....	12,235 18
Previous	45,510 14	.....	45,510 14
Total year	57,746 12	.....	57,746 12

Company Coals.

February, 1871.
No quotations during strike.

	L.	Str.	Gra.	Eg.	Sto.	Ches
Scranton at E. Port	—	—	—	—	—	—
Pittston at Weehawken	—	—	—	—	—	—
Lackawana at do	—	—	—	—	—	—
Wilk'b're at Hoboken	—	—	—	—	—	—
Old Co. Lehigh at Pt. Johnston	—	—	—	—	—	—
Lehigh at E. Port	—	—	—	—	—	—

For freights to different points, see "Freights."

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

SCHUYLKILL.	AT NEW YORK, February 4. R. A.	W. A.	AT PHILADELPHIA. February 3. R. A.	W. A.
Lump	$— —	$— —	— —	— —
Steamer	— —	— —	— —	— —
Broken	— —	— —	— —	— to —
Egg	— to —	— to —	— —	— to —
Stove	— to —	— —	— —	— to —
Chestnut	— to —	— —	— —	— to —
Pea	— —	— —	— —	— —
LEHIGH.				
Lump, (along side)	— —	— —	— —	— —
Broken	— —	— —	— —	— —
Egg	— —	— —	— —	— —
Stove	— —	— —	— —	— —
Chestnut	— —	— —	— —	— —
Pea	— —	— —	— —	— —
SPECIAL COALS.*				
Diamond Vein	R. A.	6 00	— —	— —
New England	"	—	— —	— —
Locust Dale	W. A.	5 50	— —	— —
Honey Brook, Le'h	W. A.	6 00 to 6 50	— —	— —
Spring Mountain	"	6 00 to 6 50	— —	— —
Sugar Creek	"	6 00 to 6 50	— —	— —
Sugar Loaf	"	6 00 to 6 50	— —	— —
Old Comp'y's	"	6 00 to 6 50	— —	— —
Cross Creek	"	6 00 to 6 50	— —	— —
Room Run	"	— —	— —	— —
Girardville	"	— —	— —	4 75
McMichael	"	— —	— —	4 75
Shamokin	"	5 50	5 25	— —
Lykens Valley	"	— —	5 75	— —
Broad Top	"	5 50	— —	— —
Hill & Harris	"	— —	4 75	— —
Henry Clay	"	— —	5 00	— —
Powelton	"	5 50	— —	4 75

[*Dealers in these coals may be found in our advertising columns.]

Prices for Coal at Mauch Chunk.

February 1871.

	F.L.	Bro.	Gra.	Eg.	Sto.	Chest.
Lehigh	$3 00	$3 75	$3 75	$3 75	$4 00	$3 00
Wilkesbarre	3 00	3 75	3 75	3 75	4 00	3 00

For freight to Elizabethport and to New York see "Freights."

BITUMINOUS COALS.

Kittaning Coal Co.'s Phœnix Vein	f.o.b. at Phila.	$5 00
" Lemon	" " "	4 75
Cumberland Vein Coal	" " "	4 75
Consolidation Coal Co.'s on board	N. Y.	7 00
Maryland Coal Co.	" "	7 00

Prices at Baltimore—February, 1871.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$5 80@—
Pittston and Plymouth, do	5 60@5 75
Shamokin Red or White Ash, do	—@6 00
Lykens Valley Red Ash, do	6 25@—
Zerba Valley	5 25@—
Treverton	6 00@—
By retail, all kinds per ton of 2240 lbs.	7 25@8 25
Georges Creek & Cumberland f. o. b. at Locust Point for cargoes	4 60@4 75
Fairmont and Clarksburg gas, f. o. b. at L. Point	6 00@6 50

Prices at Georget'n, D.C., & Alexandria, Va.

February, 1871.

George's Creek and Cumberland f. o. b. for shipping..$4 40

Prices at Havre de Grace, Md.

Wilkesbarre and other White Ash for cargoes	$— —@5 50
Lykens Valley	—@6 25
Shamokin Red or White Ash	—@5 75
Trevorton and Zerba Valley	—@6 00

Prices of Gas Coals.

February, 1871.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr. 41-43 Pine st., N.Y. Duty, $1 25, gold.

	Coarse.	Slack.
Block House	$1 75	@- 75
Gowrie	1 75	@- 75

Corrected by Bird, Perkins & Job, 86 South street.

	Coarse.	Culm of Coal.
Pictou	$2 25 @1 25	
Sydney	2 25 @- 80	
Lingan	1 75 @- 80	
Little Glace Bay	1 75 @1 00	
Caledonia	1 50 @- 80	

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty $1 25 per ton, gold, on the coarse coal. 25 per cent. ad valorem on the Culm of Coal.

AMERICAN.

	Currency.
Westmoreland	7 75 @8 00
Fairmount Gas Coal Co. of N. Y.	7 50 @— —
Despard Coal Co	$7 50 @— —
Penn	7 75 @8 00
Newburg Orrel Gas	— — @— —
West Fairmount Gs Coal	8 00 @— —

AT PHILADELPHIA.

Powelton	$7 80

Prices of Foreign Coals.

February, 1871.

Duty $1 25 per ton.
Corrected weekly by PARMELE BROS., No 32 Pine street New York.

Liverpool Gas Caking	$ 9 00@—
" " Cannel	11 50@12
" House "	—@16
" " Orrel	12 00@14 00

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$16 00@17
" " Cannel "	18 00@20

Per ton 2,000 lbs. delivered.

Foreign and Provincial Freights.

February, 1871.
Closed for the winter.

Foreign.

Newcastle and Ports on Tyne, per keel of 21 1-5 tons	£14 00@£16
Liverpool, 5 per cent primage	13s @16.

TO NEW YORK.

Provincial

Sidney	$ —
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

TO BOSTON.

Sydney	$ —
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

Rates of Transportation to Tide Water.

Closed for the Season.
BY *RAILROAD.*

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Port Carbon $2 00
Less drawback of 50 cents on all Coal shipped east of New Brunswick and south of Cape Henry.

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Easton	$ 90
C. R. R., N. J., Easton to Elizabethport	1 20
Shipping expenses at Elizabethport	25
Warfage	10
Total	$2 40

MAUCH CHUNK TO PORT JOHNSON.

L. V. R. R., or L. & S. R. R. from M. C. to Easton	$ 90
C. R. R., of N. J., Easton to Pt. Johnson	1 20
Shipping expenses	25
Warfage	10
Total	$2 40

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Easton	$ 90
Morris & Essex R. R. Easton to Hoboken	1 20
Shipping expenses	25
Warfage	10
Total	$2 55

TO SOUTH AMBOY.

L. V. R. R.	90
B. & D. R. R.	} 1 20
Cam. & Am. R. R.	
Shipping Expenses	25
Total	$2 25

PENN HAVEN TO ELIZABETHPORT.

L. V. RR. Penn Haven to Easton	90
C. RR. of N. J. Easton to Elizabethport	1 20
Shipping expenses	25
Wharfage	10
Total	$2 45

Freights.—February, 1871.

TO EASTERN PORTS.	From Philada Pts.	From E. Port and Port Johnston	From Newbury	From Rondout
Amesbury	$2 50	$2 00		
Bangor	2 30	1 60		
Bath	2 30	1 75		
Boston	2 10	1 85		
Bridgeport	1 75	1 00		
Bristol	2 00	1 40		
Cambridgeport	2 75	2 00		
Derby	2 00	1 20		
Dighton	2 30	— —		
East Cambridge	2 35	2 00		
Fall River	2 50	1 40		
Hackensack	1 75	1 00		
Hartford	2 50	1 50		
Jersey City	1 40	60		
Middletown	2 25	1 25		
Mystic	—	1 25		
New Bedford	2 00	1 40		
Newburyport	2 65	1 85		
New Haven	1 90	1 00		
New London	1 76	1 25		
Newport	2 00	1 40		
New York	1 35	60		
Norwalk	1 80	1 00		
Norwich	2 00	1 30		
Pawtucket	2 30	1 50		
Portland	2 30	1 50		
Portsmouth, N. H.	1 45	1 85		
Providence	2 00	1 25		
Rockport	2 10	1 65		
Saco	2 25	1 75		
Sag Harbor	1 70	1 20		
Salem	2 35	1 65		
Stamford	2 00	1 00		
Stonington	2 00	1 30		
Taunton	2 30	1 75		
Warren	— —	1 40		
Washington	1 25			
TO RIVER PORTS.				
Albany				
Catskill				
Cocksackie				
Coeyman's				
Cold Spring				
Fishkill				
Haverstraw				
Hudson				
New York				
Nyack				
Poughkeepsie				
Rhinebeck				
Rondout				
Saugerties				
Sing Sing				
Stuyvesant				
Tarrytown				
Troy				
West Point				
Yonkers				

METALS.

NEW YORK, February 3, 1871.

IRON.—Duty: Bars, 1 to 1¼ cents ₱ lb; Railroad, 70 cents ₱ 100 lbs. Boiler and Plate, 1½ cents ₱ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ₱ lb; Pig, 7 ₱ ton; Polished Sheet, 3cents ₱ lb; Galvanized 2½; Scrap Cast, $6; Wrought, 8 per ton,

	Store Prices.
Pig, Scotch No. 1, ₱ ton	30 00@34 00
Pig, American, No. 1	30 00@— —
Pig, American, No. 2	28 00@29 00
Pig, American, Forge	27 00@28 00
Bar, Refined, English and American	— —@75 00
Bar, Swedes, assorted sizes (gold)	85 00@100 00
	Store Prices, Cash.
Bar, Swedes, ord'y sizes, less 5 ₱ ct	— —@110 00
Bar, Refined " "	74 00@ 79 00
Bar, Common " "	70 00@— —
Scroll " "	97 50@125 —
Ovals and half-round " "	97 50@125 —
Band " "	92 50@ 95 00
Horse Shoe " "	95 —@— —
Rods, ⅜ to 3-16 inch " "	82 50@— —
Hoop " "	102 50@140 00
Nail rod, less 5 ₱ ct	6¾@— —
Sheet, Russia, as to Nos. (gold)	10½@—11
Sheet, Single, D, and T. Common	4¾@— 5
Sheet, Galv'd, Nos. 14 to 26 10 and 12c. Nos. 27, 28, and 29, 13@14	
Rails, English (gold), ₱ ton	56 00 @58 00
Rails, American, at Works in Pa	70 00 @73 00

STEEL.—Duty: Bars and ingots, valued at 7 cents ₱ lb or under, 2¼ cents; over 7 cents and not above 11, 3 cents ₱ lb; over 11 cents, 3½ cents ₱ lb, and 10 ₱ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ₱ lb	— 15 @— 18
English Spring (2d and 1st quality)	— 7 @— 10
English Blister (2d and 1st quality)	— 10 @— 17
English Machinery	— 11½@— 14

English German (2d and 1st quality)		— 13	@— 15
American Blister "Black Diamond"		— —	@— 12
American, Cast, Tool	do.	— 16	@— 17
American, Spring,	do.	— 9	@— 11
American Machinery,	do.	— —	@— 12
American German,	do.	— 9	@— 12

COPPER.—Duty: Pig, Bar, and Ingot, 5 ; old Copper 20 cents ℔ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ℔ lb	— @— 30
Copper Bolts	— @— 32
Copper Braziers, 16oz. and over	— @— 32
Copper Nails	— @— 37
Copper, Old Sheathing, &c., clean	19 @— 20
Copper, Chili Pig	— @—
Copper, American Ingot	22 @— 22¼
Yellow Metal, New Sheating	— @— 22
Yellow Metal Bolts	24 @— —
Yellow Metal Nails	— @— 22

LEAD.—Duty: Pig, $2 ℔ 100 lbs.; old Lead, 1½ cents ℔ lb: Pipe and Sheet, 2½ cents ℔ lb.

Galena, ℔ 100 lbs	$—	@— —
Spanish (gold)	6 15	@6 25
German, do.	6 15	@6 25
English, do.	6 20	@6 50
Bar (net)	8 75	@— —
Pipe (net)	10 25	@— —
Sheet	10 25	@— —

TIN.—Duty: Pig, Bars, and Blocks, 15 ℔ cent. ad val.; Plate and Sheets and Terne Plates, 25 ℔ cent. ; Roofing 25 ad val.

	Gold ℔ lb.
Banca	39 @—
Straits	33½@34¼
English	33¾@—

PLATES.	Fair to Good Brands. Gold.	Currency.
I. C. Charcoal, ℔ box	$8 62½@8 72½	$9 75 @10 00
I. C. Coke	7 37½@7 75	8 37½@ 8 75
Coke Terne	6 25 @6 25	6 00 @ 8 00
Charcoal Terne	7 75 @8 25	8 75 @ 9 50

SPELTER.—Duty: In Pigs, Bars, and Plates, $1 50 ℔ lb.

	Gold.
Plates, Foreign, ℔ 100 lbs.	$5 87½ 6 12½
Plates, Domestic, ℔ lb.	8¼ 11½

REMARKS.

IRON.—The demand for Scotch Pig continues light, the trade purchasing only as their wants compel, and prices are in favor of buyers. An invoice of 100 tons Glengarnock sold to arrive at $31, and 150 do. on the spot on private terms. There has been an improved demand for American at quoted rates. Forge is in limited supply, and has advanced to $28 25, being a trifle higher than No. 2. The sales are 500 tons Lehigh Valley Forge at $28 25, 700 do. Thomas, 200 do. Crane, and 100 do. Saucon, on private terms. Old Rails have been in fair request, but new are inactive, closing steady, however, at previous quotations; 900 tons old Double Headed and T sold at private prices. Refined Bar from store is without improvement in demand or price, and could hardly be moved in the present state of the streets, if there were a demand.

LEAD.—Pig remains quiet, and prices are unchanged. We have only to notice sales of 50 tons soft German on private terms, and 30 do. Spanish, $6 30@6 37½ gold. There have been considerable arrivals, but most of the parcels were sold before, and consumers are consequently supplied. Bar, Pipe and Sheet are steady at the combination rates.

COPPER.—The manufactures of Copper and Yellow Metal are steady at our quoted rates. Ingot is still very quiet; the demand from manufacturers is light, and their limited wants are supplied by purchases of outside parcels at rates below those demanded by the large holders. The sales are 50,000 lb. Lake and 20 000 lb. Tennessee at 22½ cents; and 25,000 lb. Quincy, 22½, cash; in addition to which small lots of Lake have been taken at 22½@22¾ cents.

STEEL.—Is steady at old rates.

SPELTER.—The demand for foreign is very limited; 25 tons Silesian sold at 5¼@6 cents, gold.

TIN.—The market for Pig has been unfavorably affected by the receipt of London telegrams advising a reduction in price of about £3, the quotations being for Straits £134, and English £134@135; prices here are consequently somewhat unsettled. The statistical position of the article is deemed good, and the large holders are not disposed to give way much, dealers offering in some instances to sell at prices below those asked by the principal holders. The sales are 250 slabs Straits at 33¼@34 cents, and 100 do. Malacca 34¼; English nominally 33¾, and Banca 39, all gold. Plates are in moderate demand, and are relatively better supported than Pig, so that quotations are unchanged. Sales have been made of 900 bxs. Charcoal Tin at $8 62½@8 75 for I. C.; 200 do. Coke Tin, 14 by 20, $7 62½, and 300 do. Charcoal Terne, $7 75, all gold.

ZINC.—We note a sale of 50 casks Mosselmann, to arrive, at 8 cents, less 4 per cent., gold. From store the market is very quiet at 8½@9 cents, currency; Am. Ox., 6½c.@7c.; French, 10c.@10½c., Sheet, 8½c.@9c.; Manganese, 4½c.@5c.

Petroleum.

We have but little change to note in Petroleum, if we may except "Home," which has considerably advanced. No sales are reported—"not one." Annexed is a comparative table of quotations for this and the week previous:

	BID.	ASKED
Bergen Coal and Oil	—	—
Bennehoff Run	—	5
Blood Farm	—	—
Breevoort	—	—
Bliven Oil	—	—
Buchanan Farm	35	—
Central	69	—
Clinton	—	—
Home	195	225
Phillips Pet	—	—
Rynd Farm	20	—
United Petroleum Farms	15	20
United States	—	80
National	—	—
New York & Allegheney	—	—
Northern Light	—	20
Pit hole Creek	60	90
Rathbone Oil	—	—
Second National	—	20
Sherman & B	—	50
Rynd Farm	—	19
Hoffman	5	8

Mining Stocks.

NEW YORK, Feb. 3, 1871.

No transactions in mining stocks are reported by the Board. Quotations are merely nominal. We should not probably feel the effect of the Board at all, were it not for a slight variation in the price of a few stocks, as shown in the following comparative table:

Savage	45¼
Yellow Jacket	41
Kentuck	33
Chollar Potosi	No sales.
Gould & Curry	45½
Belcher	9⅞
Imperial	6
Amacor	303
Crown Point	—
Hale & Norcross	—

San FranciscoStock Market.

Our reports from the San Francisco Mining Stock Board, per telegraph, dates the 2d inst. We have not much change to note in quorations, in comparison with our report of last week. Amador has considerably advanced, compared with the report given two weeks ago. Below is a comparative table for this and the week previous:

	BID.	ASKED
Bates and Baxter	25	27
Benton	6	8
Black Hawk	23	40
Central Gold	9	15
Consolidated Gregory	24	40
Grass Valley	6	12
Gunnell	17	20
Smith and Parmelee	19	20
N. Y. & Eldora	20	—
Quartz Hill	10	15

The Slate Trade.

[Corrected weekly.]

(A "square" represents 100 superficial feet.)

PRICES OF ROOFING SLATE.

Vermont purple, 1st quality, per square	$6 50@	7 00
" green, 1st " "	6 50@	7 00
" red, 1st " "	15 00@	16 00
" variegated, " "	5 75@	6 20
Pa. b'k and d'k blue, 1st qual., "	6 00@	7 05

PENNSYLVANIA SLATE TRADE.

SHIPMENTS OF SLATE OVER THE LEHIGH VALLEY, AND LEHIGH AND SUSQUEHANNA R. R., AND THE LEHIGH CANAL:

For the week ending January 28, 1871.

LEHIGH VALLEY R. R.

ROOFING SLATE.

Girard Slate Co	105	squares.
Jones & Williams	70	"
D. Williams & Co	—	"
Saylor & Morgan	—	"
H. Williams	35	"
Lehigh Slate Co	—	"
American Slate Co	35	"
Hope	35	"
Keystone	—	"
Locke	—	"
J. Anthony	—	"
Kuntz & Woodning	—	"
Columbia	35	"
Total	315	"

SCHOOL SLATES.

D. Williams	36	cases.
Lehigh Slate Co	—	"
Locke Slate Co	25	"
H. Kuntz	4	"
Total	65	"

BLACK BOARDS.

Yerkes & Martin	18	"
Lehigh Slate Co	1	"
Total	19	

MANTELS.

Yerkes & Martin	23	"
Lehigh Slate Co	26	"
Total	49	"

VERMONT SLATE TRADE.

REPORT of Slate Shipped from Middle Granville, N.Y., via the R. & S. R. R., for the week ending January 28. and for the year 1871.

ROOFING SLATE.

NO. OF SQUARES.	Week.	Prev'ly.	Year.
Penrhyn Slate Co	95	....	95
New York Slate Co	....	....	....
Middle Granville Slate Co	....	....	....
American Slate Co	....	....	....
Benj. Williams	65	70	135
Jones & Williams	....	....	....
Eagle Slate Co	....	....	....
H. W. Hughes	....	....	....
J. D. Jones	....	....	....
Total	—		—

MANTELS, &C.

NO. OF CASES.	Week.	Prev'ly.	Total.
Eagle Slate Co	....	....	....
Penrhyn Slate Co	152	266	418

MILL STOCK.

NO. OF CASES SHIPPED BY	Week.	Prev'ly	Total
Eagle Slate Co cars	..	2	
Penrhyn Slate Co "	—	—	—

THE CHALMERS-SPENCE PATENT NON-CONDUCTOR CO.

ST. LOUIS BRANCH,
1202 & 1204 N. Second street.

Never deteriorates. Saves 20 per cent. Keeps steam perfectly dry. Twenty of the largest Mississippi boats have their boilers, pipes, etc., covered with this invaluable material.

J. B. ROACH, Treasurer. T. CHALMERS, Manager.

PROPOSALS FOR WORKING THE PETROLEUM MINES OF SANTA ELENA, IN THE REPUBLIC OF ECUADOR.

VICE-CONSULATE OF ECUADOR,
No. 7, B oadway,
New York, January 30th, 1871.

The Government of Ecuador will receive proposals for leasing the lately-discovered petroleum mines at Santa Elena, in that Republic, upon the following conditions:

The lease will be granted for a term of not less than ten and not exceeding fifty years, and the annual rental to be not less than $15,000 (four francs to the dollar), payable in advance, thirty days before the beginning of each year.

The lease will comprise only the mines of petroleum, and not those of coal, iron, sulphur or salt.

All the machinery, implements, tools etc., for working said mines, and all the necessary building materials, will be admitted free of duty; the export duty on the petroleum and pitch will also be remitted.

The lease will terminate *ipso facto* on the non-payment of the annual stipulation, and the machinery, buildings, and all materials belonging thereto, will be forfeited to the Government.

The undersigned will receive proposals, addressed to the Government of Ecuador, until the 3 st day of May, 1871, or the same may be forwarded direct to the Governor of Guayaquil.

The proposals will be opened on the 1st day of July, and the lease granted to the highest bidder, and the stipulated terms will take effect on the 25th of the same month.

The right is reserved on the part of the Government to reject any or all of the bids, if it be deemed for its interest to do so.

The mines are situated contiguous to the Pacific, and very near the port of Ballenita, where the steamers of the P. S. N. Co touch once a month.

The water wells are located at some distance from the mines.

The climate is exceedingly salubrious and healthy, and the mildness of its temperature renders it most desirable as a place of resort for invalids.

By order of his Excellency the Minister of Ecuador in the United States.

N. R. ANSADO,
Vice-Consul, Attache of the Legation.

REPORT OF THE GOVERNMENT ENGINEER.

To His Excellency the President of the Republic of Ecuador:

HONORABLE SIR: According to the instructions of your Excellency, I have been to Santa Elena, in order to survey the mines of petroleum, which for many years have been known to exist there, and I am happy to be able to express the opinion that that portion of the coast will certainly become a centre of importance for mines not only of petroleum, but also of sulphur, salt, iron and coal.

Petroleum is to be found in the country in very large quantities. On a surface of about four square leagues from the sulphurous springs of San Vicente to the sea shore, wells have been sunk and the bituminous matter obtained in a liquid state. Its consistence is not the same in the different wells. In some of them it is fluid, like whale oil, in others it has the consistence of butter at ordinary temperatures. At the upper part of many wells it can be seen in hard, compact masses, which probably have been formed by the evaporation of the liquid. This crude petroleum has a dark brownish color, which gets darker with the greater consistence of the oil. Only in one place, where it oozes from the bed of a dried stream, the bituminous matter has a greenish color.

Its smell is not disagreeable, which is generally the case with many of the American, and especially the Canadian oils. The olfactory nerves do not need a ninety-six hours' acquaintance with its odors to become insensible to them.

As the inhabitants have neither the knowledge nor the implements required, the works are very rude. Pits, from ten to twelve feet deep, are dug into the sand till clay is reached, and when the oil, which oozes from all sides, has filled them, it is dipped out.

Near the wells are primitive furnaces, buit with sundried clay, on which are open iron boilers. The bituminous matter is thrown into these vases, and cooked until all the volatile products disappear, and leave a thick pitch.

It is generally admitted that petroleum has been produced by the slow distillation at low temperatures from coal and other bituminous minerals. It is also acknowledged that it is found oftener stored in the fissures in the rocks and most plentiful in those regions where the strata has been most disturbed, and where, as a consequence the largest number of fissures occur.

In the special case of Santa Elena, it is not admissible to suppose that petroleum has been formed in the upper sandy deposits. Its presence there can only be explained by the escape of the bituminous matter from the fissures in which it was contained under a powerful volcanic action, which, in certain places, has completely broken and disturbed the different strata. We may then perfectly admit that, although large quantities of oil are to be found in the sand, it is only the mere waste of the real springs.

Deeper sinking will, without any doubt, be very profitable and yield immense proportions of petroleum. For want of instruments I could not verify the fact and give material proof.

Their proximity to the sea is another advantage of these mines. While great difficulties have been encountered in the United States for the conveyance of the oil from the oil districts to the shipping ports, here it may be conducted at a very small expense, from the wells to the port of Santa Elena, by means of pipes, if the crude oil is exported. Although I should think that it would be more profitable to refine it at the place of production, but the advantage expressed remains the same.

By their extent, by the enormous quantity of petroleum that they contain, by the short distance which lies between them and the sea, these mines have a real value. Intelligent capitalists will promptly appreciate it, and works will soon be established.

By building refineries at Santa Elena enough kerosene might be produced for the use of the country and for the markets of the neighboring republics. I took with me some of the bituminous matter, which I shall analyze on my arrival at Quito, so as to know the proportion of the different matters contained in it. I shall have the honor of sending a special report to your Excellency upon the subject.

Having finished with the survey of the oil region, I went to the village of La Sa.ina, where are established the salt pits. I also found there great wealth, but not developed.

Pits are dug in the sand, which are filled by the sea once a year, at the end of February, when it rises very high. When the water thus imprisoned in the pits is sufficiently condensed under the influence of the sun, the salt is deposited; but the workingmen do not collect it until the pits are completely dry. It would be preferrable to collect it before, as the presence in the salt of sand and many other impure matters contained in solution by the water would be avoided. It would also be useful to send some cars for the transport of the salt.

As the surface of the ground thus covered by the sea once a year is very extensive, very many pits might be dug without great expense, and the production of salt largely increased.

Sulphur is to be found in abundance, but I do not think it possible to extract that mineral with profit, as the expense of transportation to the markets of Europe or the United States would be too great.

The hot springs of San Vicente, placed near a small volcano, contain sulphur and salt. There are several springs, having each a different temperature. One of the warmest has near the surface about 27° Reaumur. They might, perhaps, usually be employed in rheumatism and certain cutaneous diseases.

In all the neighboring places of Santa Elena limestone is to be seen, which will be very useful for building purposes.

Iron and coal seem also to exist in different places. As I could only make a superficial survey, I am not able to express any opinion upon the richness of the deposits, but I met large quantities of red and brown peroxydes of iron near the surface.

As regards coal, I have also seen evident signs of its existence. Not only a large portion of the country belongs to the carboniferous system, presenting sandstone, caldy limestone, shale, etc., but at the top of a mountain at about five leagues from Colonches I discovered veins a quarter of an inch thick.

Very likely thicker beds would be found by sinking a shaft; but unfortunately to work at that point would present such difficulties as to render the price of coal obtained too high.

I am, however, perfectly satisfied that the sinking of shafts, intelligently directed, will show the presence of coal in more accessible places.

I end, honorable sir, this report, with the strong conviction that the port on of the country that I have had the honor of surveying, although arid, will be found rich in minerals.

Begging your Excellency to accept the assurance of my respect and my devotion, I remain, honorable sir, your very obedient servant,

RAYMOND DE PEIGER, Engineer.

OFFICE OF THE NEW YORK CITY OIL CO.,
No. 116 Maiden Lane,
NEW YORK, Jan. 16th, 1871.

N. R. Ansado, Esq., Attachee Legation of Ecuador:

DEAR SIR,—The sample of crude petroleum submitted to me for analysis, samples of products of Ecuador, I find to correspond to samples that I have examined from Utah, Colorado and Mexico. We call such oil "surface oil," since it has come in contact with the atmosphere, and lost by evaporation all of its paphtha, and most of its kerosene or burning oil.

It yields no naphtha	0.00
" " kerosene, or burning oil, per cent	0.15
Paraffine lubricating oil	0 40
Water and ammonia	0.10
Petroleum tar, similar to asphaltum and coke	0 35
	1.00

In the New York market, at present, paraffine lubricating oil is worth more than kerosene or burning oil.

Pennsylvania petroleum, taken from 400 to 800 feet below the surface of the earth, yields—

Incondensible gas, about	0.05
Naphtha	0.15
Burning or kerosene oil	0.65
Paraffine, or lubricating oil	0.95
Tar, coke, &c	0.10
	1 00

By sinking wells into the earth where the geological structure warrants, petroleum similar to the Pennsylvania petroleum has been found where "surface oil" like the sample has been found. Yours truly,

E. G. KELLEY, Chemist,
Feb. 7, 1t. 116 Maiden lane, N. Y.

Substantial Success Based on Merit!

THE

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Polytechnic Club of the American Institute.

Meeting held at the rooms of the Association, Jan. 26, 1871. Prof. S. D. TILLMAN in the chair.

THE CHAIRMAN presented the following interesting scientific items :—

NEW PROCESS OF CASTING METALS.—The London *Quarterly Journal of Science* says that a considerable number of gentlemen lately met at the Lancashire Engineering and Compression Casting Works of St. Helen's Junction, to witness the new process of casting in brass and iron, chased and embossed work of the most elaborate description. The process, which was then for the first time exhibited in England, is an American invention, and its utility was shown to consist in this—that any design, whether in high or low relief, chased on metal of any required pattern or shape, whether flat as a door-plate or round as a vase, can be reproduced by casting *ad infinitum*, and each casting will show upon it all the sharpness of the original chasing. Molds are made with a preparation of fine clay. The making of one of these molds takes from five to ten minutes. They have then to stand twenty-four hours exposed to dry air, after which they are baked in a furnace for eight hours. These clay molds, into which the metal is afterwards poured, are, to all intents and purposes, encaustic tiles. The molds are placed in a box, and the air is extracted from them so as to form a vacuum, after which the molten metal is forced into them ; and in this way, in ten minutes, a casting can be completed. When the casting is taken out, the design, however intricate, is found to be perfectly represented, with the exception of removing a slight surface of clay from it, which can be done in half an hour, and the article is then ready to be sent to the bronzer, instead of having to be put in the chaser's hands. In this way an enormous amount of cost and labor on ornamental articles in metal is saved.

ARTIFICIAL PREPARATION OF INDIGO.—The *Industrial Gazette* of Chemnitz, Saxony, says that in the beginning of 1870, BAEYER and EMMERLING, of Berlin, found that indigo might be prepared from isatin, which latter may be produced from cinnamonic acid. This mode of preparation, however, was attended with a serious drawback, on account of the difficulty of obtaining the cinnamonic acid. Quite recently, however, EMMERLING and ENGLER discovered that the same result may be accomplished by means of benzoic acid, which is quite easily obtained from the urine of horses. It is expected that by improving this method, the importation of indigo from Oriental countries will be considerably diminished. A mixture of benzoate of lime with acetate of lime, if subjected to distillation, yields a compound which may be regarded as the alcohol of benzoic acid, in which the hydrogen of the water has been replaced by the radical methyl. If this body is treated with strong nitric acid a product containing nitrogen is obtained, in which one atom of hydrogen is replaced by one atom of hyponitric acid. The *Gazette* gives the formula of this reaction, which is here omitted, but it will be readily understood when we state that it only differs from the chemical formula of indigo blue in having a surplus of two atoms of hydrogen and two of oxygen. Now, by simply adding hydrogen, which is accomplished by heating the compound with a mixture of soda, lime and zinc dust, water is formed, and indigo is obtained, although in very small quantity. We may here remark that BAEYER is also the author of the artificial preparation of the principal pigment from madder, alizarin, which is now manufactured on a large scale in Germany.

ON THE MELTING OF LEAD PROJECTILES BY IMPACT.—In *Poggendorff's Annalen*, Mr. E. HAGENBACH applies the mechanical theory of heat to account for some of the results of the experiments recently made at Basle, with the view of using targets of iron instead of wood in practice with fire arms. Strong plates of iron were fired at from the distance of 100 paces. Conical bullets, by their impact against the iron plate, produced scarcely perceptible indentation, and fell down near the target ; at the same time the lead projectile was melted to a very considerable extent. This could be recognized by the fact that around the point where the ball had struck, the plate was spattered with lead in the form of a white star ; that, moreover, the melted lead was found in the vicinity, and that of the original bullet, which weighed 40 grammes, only the comparatively small portion of 13 grammes remained. By the author's calculation, the force expended on the ball gives, as mechanical equivalent of the heat, 0.49 thermal unit. He then proceeds to inquire how much heat is necessary to produce the melting described. The entire projectile (40 grammes) had to be raised to the temperature of the melting-point of lead, or near it ; and the 27 grammes had to be melted. Assuming 100° C. as the initial temperature of the ball, which was somewhat warmed by the heat of combustion and by friction, the melting point of lead being 335° C., its specific heat 0.031, and its latent heat of fusion 5.37, he finds necessary for heating 0.29 thermal unit, and for fusion 0.15, giving a total of 0.44 thermal unit, this being only .05 less than the estimated mechanical equivalent. Thus the mechanical theory of heat sufficiently accounts for the operation. Almost all the impetus of the motion of the body is transformed into heat—a result which was indeed to be expected, seeing that the iron plate was very slightly deformed, and the projectile rebounded but little. By far the greater portion of the heat was used in heating and melting the lead. This is also readily understood ; for the short time within which the entire process was effected could give rise to but little loss by conduction and radiation.

SIEMAN'S PYROMETER.—This instrument was the subject of considerable discussion at the last meeting of the British Association for the Advancement of Science. It is entirely unlike those pyrometers which indicate high degrees of temperature by means of the difference in dilation of two solids exposed to the same temperature. Such pyrometers have been found untrustworthy, principally from two causes : First, the rate of expansion, on exposure to regularly increasing heat, is not uniform. Second, certain metals and other solids do not resume their original length after being heated and cooled. The indications obtained from pyrometers of this class exposed to very high temperature have never been trustworthy, hence there has been such uncertainty as to the actual heat used in many chemical experiments that no definite conclusions could be arrived at as to the actual temperature required to accomplish a desired change. Mr. SIEMAN'S pyrometer has taken advantage of the fact that electric force passes more slowly through a platinum or an iron wire, in proportion as it is exposed to higher degrees of heat. Platinum, moreover, required a higher heat to reduce it than any other metal, since it only yields before the flame of the hydro-oxygen blow-pipe. It can, therefore, be used to measure any degree of heat generated by the combustion of carbon. Mr. SIEMAN'S apparatus for measuring high temperatures, for instance, those of the smelting furnace, consists of a coil of fine platinum wire, which is wound on a cylinder of burnt clay, having on its surface spiral grooves into which the wire fits, thus protecting the wire and insulating it so that the current muss pass through its whole length. That wire is connected at each end with a copper wire, which carries the current of electricity to the ordinary galvanometer, where the actual force of the current is indicated, and the movement of its needle becomes a correct index of heat. For temperatures below a red heat, an iron wire may be substituted for the platinum. The instrument prepared for Dr. CARPENTER, and successfully used by him in ascertaining the temperature of the sea at great depths, consisted of a fine insulated iron wire several miles in length, inclosed in a hermetically sealed tube to protect it from the influence of moisture and rusting. The platinum pyrometer has been successfully used in the Imperial Iron Works of Russia, and in gas works where the temperature of the coal distilled materially influences the quality of the gas. A great advantage in the use of this instrument is that the record of changes may be made many miles distant from the point where the wire is exposed to heat.

THE SOLAR ECLIPSE OF 1870.—Professor YOUNG, of Dartmouth College, one of the U. S. Scientific Corps, sent to Europe by our Government to make observations of the solar eclipse of December 22, 1870, which was total in portions of Spain and in Sicily, has sent the following communication to Professor MORTON which, from the known failure of several other corps to obtain reliable observations on account of unfavorable weather, will be read with increased interest :

"By the courtesy of Prof. WINLOCK, I am permitted to communicate the general results of our observations on the eclipse. I think I may say that, on the whole, our expedition has been highly successful, though more might have been accomplished had the weather been better. We seem, however, to have been more favored even in this respect than any of the English parties observing in Spain. From those in Algeria and Sicily I have not yet heard. The day and night previous to the eclipse were very fine, but early in the morning it clouded over, and when we arose the prospect was very gloomy. It even rained from time to time. We made all our observations, however, and before first contact (10:25 A. M., local time) there were many patches of partly clear sky, but there was always, even when clearest, enough haze of frost crystals to cause the sun to be surrounded by a conspicuous halo of 22½° radius.

"At the time of first contact, it was clear enough to allow good observations to be made in the usual method. I attempted to use the spectroscope upon it in the same manner as last year, but failed on account of the thin cloud which most of the time entirely obliterated the chromosphere lines. Between the time of first contact and totality, there were several intervals of moderate clearness, in which photographs of the partial phases were taken. Just before totality the clouds became much thicker, and we nearly gave up hope ; but at the needed time, almost by the direct interposition of Providence, as it would seem, a small rift in the now heavy clouds passed over the sun, and permitted us to observe the sublime phenomenon, if not in all the beauty and sublimity of last year, yet satisfactorily and most gratefully. Within five minutes after the end of totality the sky was wholly clouded, and we did not see the sun again until near evening, after a heavy storm of wind and rain. During the totality, one good photograph of the corona was obtained with the 6-inch glass with an exposure of 1½ minutes. It is, of course, by no means so good as it would have been had the sky been truly clear, but it shows a great deal of detail, curved filaments, and radial shadings far better than ever before obtained. The picture produced with the 8-inch glass was injured by not being removed until the sun came out. No attempts were made to photograph the prominences which can be seen and studied at any time. All efforts were concentrated on the corona.

"In respect to the polarization of observations there is reason to suppose that there must have been some peculiar defect in the particular instrument Prof. PICKERING used last year, as his assistant, Mr. Ross, using it on this occasion, obtained the same unsatisfactory result. But, apparently similar instruments, used this year, together with others quite different in construction, indicated radial polarization of the corona. The appearances in the instruments were much complicated by the cloud and haze, but I believe Prof. PICKERING and Prof. LANGLEY both agree that the corona certainly has a considerable proportion of its light radially polarized. Our spectroscopic results completely confirm those of last year, and except that the two faint lines which I saw between D and E last year, and suspected to be corona lines as well as 1474, were not seen at all this time ; 1474 was traced by Prof. WINLOCK to a distance of nearly 20′ from the sun's limb. I traced it 16′ on the West, 12′ on the North, 14′ on the East, and about 10′ on the South. The principle chromosphere lines were also visible in the corona to a distance of 3′ or 4′. Prof. WINLOCK and myself both agree in attributing this to the reflection of the haze around the sun. I am more confident as to this, because last year, in a clear atmosphere, the C line was certainly sharply terminated at the upper limit of the chromosphere or prominences under observation. Mr. ABBAY, in his spectroscope saw only the 1474 line and the F line—the former was considerably the brighter of the two. He saw no continuous spectrum.

"But the most interesting spectroscopic observation of the eclipse appears to me to be the ascertaining of the chromosphere, and, of course, in immediate contact with the photosphere, of a thin layer in whose spectrum the dark lines of the ordinary solar spectrum are all reversed. Just previous to totality, I had carefully adjusted the slit tangential to the sun's limb at the point where the second contact would take place, and was watching the gradual brightening of 1474 and the magnesium lines. As the crescent grew narrower, I noticed a fading out, so to speak, of all the dark lines in the field of view, but was not at all prepared for the beautiful phenomenon which presented itself when the moon finally covered the whole photosphere. Then the whole field was at once filled with brilliant lines, which suddenly flashed into brightness and then gradually faded away until, in less than two seconds, nothing remained but the lines I had been watching. The slit was very close, and the definition perfect. Of course I cannot positively assert that all the bright lines held exactly the same position that had been occupied by dark ones previously, but I feel very sure of it, as I particularly noticed several groups, and the whole arrangement and relative intensity of the lines struck me as perfectly familiar. Mr. PYE saw the same thing, for an instant only. Prof. WINLOCK did not, as his telescope at the time, in accordance with his directions, was pointed to a spot at some distance from the sun's limb ; neither did Mr. ABBAY see it. This observation is a confirmation of SECCHI's continuous spectrum at the edge of the sun, and I think tends to make tenable the original theory of KIRCHOFF as to the constitution of the sun and the origin of the dark lines in the ordinary solar spectrum. I cordially acknowledge the courtesy and kindness of the the inhabitants of Jarez. Everything possible was done to assist us and make our stay agreeable.

"C. A. YOUNG."

Mr. CHARLES B. BOYLE said that he called attention a year ago, in reference to the photographs of the total eclipse exhibited in the Fair of the American Institute a year ago, that along the moon's edge there was a halo. Since the disc of the moon was as black as the field of the sky, had this halo not owed its origin to the moon, it would have extended around the whole edge of the solar disc. Possibly the thin layer which Prof. YOUNG discovered is connected with the same cause which produces this halo.

The PRESIDENT—It strikes me that this may tend to confirm a theory I advanced many years ago, that all bodies throw off vibrations. All bodies throw off heat, and heat is nothing but motion in the form of vibration. I took the ground then that the moon must throw off vibrations of light and heat which did not reach us, but which, at some time or other, we should ascertain to exist. Just as even a piece of cold iron is throwing off heat, which it will communicate to a body colder than itself, so every body in the universe, from the largest suns, the planets, the moons, down to the smallest atoms, is constantly, and must be from the nature of its constitution, throwing off vibrations. In the case of a solar eclipse, the sun is vastly behind the moon, and the light from the sun passing by the moon's edge will suffer a reflection of some of its rays, which will give us the luminous appearance along the edge of the moon.

Mr. BOYLE—If this were due, not to refraction but to reflection, I think we should have the halo before the moon comes in contact with the sun.

The PRESIDENT—You cannot see this with the eye ; it is only in the picture that we see it.

Mr. BOYLE—We see falsely with the eye. You will remember that in the lecture of Dr. GOULD, of Cambridge, before the Institute a year ago, he showed us a number of pictures painted from the eye, and photographs, and that the photographs showed us things entirely different from what the eye did, for the reason that the eye sees falsely. There is the bright disc of the sun, and it is remarkable that this should be brighter than the disc. I know of no optical means of accounting for it, excepting by the refraction of the light from the sun, passing by the edge of the moon.

The PRESIDENT.—What produces the refraction?

Mr. BOYLE.—The refracting medium about the edge of the moon.

The PRESIDENT.—How do you know there is any?

Mr. BOYLE.—From the refraction. I regard this very phenomenon as an argument in favor of the existence of an atmosphere around the moon. The gradually decreasing brightness of the illumination corresponds with the results which would naturally follow from refraction by an atmosphere, gradually becoming less dense as we rise above the surface. I have found that I could distinctly trace this luminous appearance to a height of 36 miles above the surface of the moon. The refraction of the earth's atmosphere at the level of the sea is less than a degree and a half ; one half of which is the horizontal refraction we can observe. Now the height of the lightest cirrus clouds is only about three miles. If the atmosphere of the moon was equal to the height of our cirrus clouds, it would not lift the aqueous vapor of the moon high enough to become visible. Yet many observers have supposed, and I think they must be correct, that they have seen clouds in the moon, over some of the basins on the moon's surface. If they have seen clouds, there must have been an atmosphere to sustain them. It must be remembered that in observing an occultation, we do not see the general level of the moon, but the edge of the disk is composed of the tops of the lunar mountains, about a mile on the average above the general level. The fact that the axis of the moon directed towards the earth is prolonged, makes it the more certain that there will be mountains enough along the edge to prevent our seeing below their tops. At the height of our cirrus clouds, the earth's refraction would probably be less than one-quarter what it is at the sea level ; and at the top of the moon's mountains, the refraction would be still less ; so that it would be impossible for us to see whether there is any dip in the stars occulted, or not. One observer has supposed he did see stars dip ; but if that were so, it would argue a very dense atmosphere indeed.

In this connection I desire to explain to you an instrument I presented to Dr. DOREMUS last summer, the object of which was to photograph the photosphere. In order to avoid the sun's light, I cut an elliptical hole in a metallic plate, placed at an angle of 45 degrees in the cone of rays from the sun, of such form and rise that the rays from the disk itself shall pass through the whole, while the rays from the photosphere, immediately around it, shall be reflected to one side, to produce the photograph. It has been suggested by Dr. DRAPER that the luminous condition of the earth's atmosphere would prevent photographing the photosphere by this means. If that is all the objection, it strikes me that such an apparatus might be succesfully employed upon the tops of our highest mountains, and the entire photosphere of the sun might be photographed every day.

Dr. ADOLPH OTT then proceeded to read a paper on the Toredo or ship-worm. Adjourned.

THE ENGINEERING AND MINING JOURNAL.

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ROSSITER W. RAYMOND, Ph. D., Editor.

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Mr. Garnett's Patent System.

MR. LOUIS A. GARNETT, of San Francisco, has addressed to the *Alta California* a long and elaborate letter, in which he reviews our recent criticisms upon his method of ascertaining the gold and silver production of the country. His satirical remarks upon Mr. RAYMOND, and his wholesale condemnation of reports which he has been "too busy to read," we can afford to pass by. Mr. RAYMOND and his reports are not on trial before judges who begin by revealing that they know nothing about either.

Nor is the question, at present, whether the Commissioner's *estimates* of bullion production are *statistically* correct; but whether Mr. GARNETT's *statistics* are so. The difference is obvious. One does not pretend to exactitude; the other claims it positively, and wrathfully "demolishes" any one who contradicts him. Not being in extraordinary fear of the manager of "the largest assay office in the United States," we said his "method" was based on a huge error; a statement which we now repeat. All that he has achieved in his very long letter is to add a few more errors to his fundamental ones.

We desire to be as brief as is consistent with clearness; but before proceeding to re-open the argument as to the GARNETT method, we must clear the field of a little rubbish, not so pertinent, perhaps, to the real question as to our own and Mr. GARNETT's reputations.

In the first place, Mr. GARNETT complains that we said the object of his pamphlet was to "bear" the bullion product; that we treated his statistics of local receipts at San Francisco as estimates of the production of the country, and that we called his system a "patent" one.

As for the object of Mr. GARNETT's pamphlet, that subject will "keep." Its "avowed" object anybody may see who will read it. A passage on the eighth page led us to believe that Mr. GARNETT estimated the product of gold in 1867 at $35,000,000. We did not pay any attention whatever to his figures of local receipts at San Francisco. Finally we called his system a "patent" one, because he claimed it as new. The term was perhaps a misnomer, as there is really nothing patent about it except its absurdity, and that is patent to other folks, and not to Mr. GARNETT. We shall, however, discuss his claims and specifications presently.

More rubbish. Mr. GARNETT, being too busy to hunt up the authority for our statement that $45,000,000 gold was taxed in 1867, finds it convenient to assert that we took the amount of tax collected at San Francisco, and "committed the monstrous absurdity" of computing the amount value of the gold, without reducing the currency value to gold. This would have been indeed absurd; but it is not our habit to mistake San Francisco for the United States, or coin for currency, both of which ingenious errors the eminent statistician of the Golden Gate here commits. The amount we gave was gold, and it was correct. Mr. GARNETT triumphantly inquires why we did not give the silver also, and answers his own conundrum by saying that the returns before us, even in currency, would only account for $1,800,000. We did not give the silver because we were talking of something else, and had not learned the art of lugging in what had no application to the point. If we do not learn it now, it will not be for want of a model. But we will give Mr. GARNETT his gold and silver, both in currency and coin values, from the official figures of the Commissioner of Internal Revenue.

TAX ON BULLION FOR THE CALENDAR YEAR 1867.

In currency on gold bullion	$313,618
" " " silver "	90,375
Gold bullion, value in currency	62,723,680
Silver " " " "	18,074,996
Gold " " " coin	45,161,050
Silver " " " "	13,013,997

Currency estimated at 72 cents in coin.

Mr. GARNETT denies having put the gold product for 1867 at $35,000,000; and does not say what his estimate was. Our attempted comparison therefore falls to the ground. We do not greatly care for that, since, as we said before, the bullion tax was not so thoroughly collected as to show the whole production of gold. This, of course, Mr. GARNETT denies; but it is true nevertheless. We have considerable evidence, showing at least three distinct ways in which the tax was evaded. In the first place, it was the interest of dishonest assayers, after collecting the tax from depositors, to withhold a part of it from the collector; in the second place, by an understanding between assessors and assayers in districts remote from commercial centres, the bullion was largely undervalued, on the plea of cost and risk in sending it to market; in the third place, during the continuance of the tax, large amounts of gold were carried by the miners themselves, out of the mining districts and out of the country, without ever being assayed. These are not fanciful statements, but actual observations. It should be borne in mind that the tax was an odious one, and that the sentiment of many communities justified every means of evading it.

Mr. GARNETT "cannot resist the temptation" to assert that certain figures which we quoted from the *Alta California* were never in that paper. If he is not "too busy" to ascertain the error of his assertions after making them (as he was *before*), he will be edified to find the figures in question in the *Alta California* for Nov. 5, 1870. Of course they are not correct. We did not call them in question, simply because we had not in our possession, at the time, the official figures. We *did* correct the *Altas'* misstatement of gold coinage for 1869-70, substituting for its false "official" figures the real ones. But here Mr. GARNETT finds another mare's nest. As usual, "there is an error in every line. The amount of domestic gold coined at the mint is not $22,257,312, but $21,553,345. Mr. RAYMOND takes his figures from table C, which shows simply the coinage of the mints, and embraces the coins made from foreign bullion as well as from domestic. He should have taken them from table B, showing the domestic deposits exclusively, and deducted from that amount the deposits at the New York assay office, less the amount of fine bars sent to Philadelphia for coinage."

We gave the coinage at the mint, because that was what the *Alta* had professed "officially" to give. But Mr. GARNETT's way of getting at the *domestic* coinage is merely laughable; and we "cannot resist the temptation" of showing "his utter ignorance of the subject, as well as his remarkable faculty of doubling up his results."

In the first place, there is a considerable discrepancy between deposits and coinage for any given period. Mr. GARNETT's method would show (if it showed anything) the amount of domestic gold deposited for coinage, not the amount coined. But passing this by, as a confusion of terms merely, we turn to tables A and B of the mint report for 1869-70, and perform the GARNETT hocus-pocus, strictly according to directions, thus:

From the total domestic deposits	B)	$26,487,670
Deduct those at New York	(B)	$5,876,149
Less fine bars sent to Philadelphia	(A)	941,824
		4,934,325
Leaving Mr. GARNETT's "domestic gold coined"		21,553,345

There is a trifling item of $592,050, Denver mint bars redeposited in New York, another of $18,995, Denver mint bars, and one of $419, Charlotte mint bars, redeposited at Philadelphia. Mr. GARNETT, who declares the data afforded by table B to be "absolutely accurate," innocently reckons these redeposits twice over, making a net error of $572,636.

Again, the item of fine bars sent to Philadelphia (A) $941,824 consists in reality of $818,512 fine bars, and $123,312 "deposit gold." Of the latter, $9,266 only is domestic gold, while $114,046 is jewellers' and foreign gold, which has already been deducted from the deposits. Mr. GARNETT is therefore "doubled up" again, and his errors so far amount to $706,096 on one side, and $19,414 on the other, or $686,682 net. This is a good beginning, for a gentleman who was "connected eight years with the mint." But the tables referred to show furthermore that much of the gold sent to the mints was not deposited for coinage. This is the case with $379,019 of the Denver deposits, $15,689 of the Charlotte deposits, and $171,625 of the Philadelphia deposits (though this last item may be partly foreign gold). Still again, the $941,824 sent from New York to Philadelphia includes, as we have said, $114,046 jewellers' and foreign gold; but there is also a considerable amount of jewellers' and foreign gold included in the $818,512 fine bars actually sent. So Mr. GARNETT's theory is as bad as his practice. The fact is that, in spite of his assertion, the reports of the mint do not afford "absolutely accurate" data of domestic deposits for coinage, still less of domestic coinage.

Mr. GARNETT announced his intention of "carrying the war into Africa." We trust he is satisfied with the results of his African campaign. Having learned the real significance of his vaunted victories on the line of the enemy's communications, perhaps he will pay some attention to the situation of his own besieged capital.

The GARNETT patent method is thus set forth by its inventor in his pamphlet:

"I have adopted a different method for arriving at the product from that usually resorted to for this purpose, which seems to have been but little better than the crude approximations of individual miners, bankers and others, whose pursuits are supposed to render them competent judges, but who really have no data sufficiently comprehensive to determine the aggregate product. I go upon the theory that native gold is not hoarded as bullion, nor is it used to any extent in the arts—as the silver it contains renders it unsuitable for such purposes, as compared with gold coins, which are properly alloyed, of known value, and are, besides, cheaper. Our entire product of gold, therefore, must either find its way to our mints, for coinage, or must be exported as bullion. The annual reports of the Director of the Mint furnish us with data, absolutely accurate, as to the gold of native production deposited at the mint and its branches. If we deduct from this amount the fine bars manufactured and not re-deposited for coinage, *and which will be accounted for in the exports*, we arrive at the amount of original deposits of gold of native production actually converted into coins. If, then, we add to the amount, thus ascertained, the exports of gold bullion of native production, as shown by the Commerce and Navigation reports of the United States, we arrive at the total product." (The italics are ours.)

If there is any force in language, this is a declaration that all the gold produced in this country is either coined or exported. To the natural question, what account is taken of gold employed in manufactures, the reply is given beforehand, that it has first been coined. To the equally natural question, what account is taken of mint bars not coined, the reply is given beforehand, that they are accounted for in the exports. Both these assertions are "huge errors;" and if fourteen years of "experience" have not taught their author this truth, we advise him to try five minutes of modest and sincere inquiry.

In his letter, there is a muddy allusion to this point. He insists that manufacturers use no native gold, because he never knew of an application at the mint or at his assay office for a single ounce of native gold or silver. As we were careful not to speak of *native* gold (that is, crude retort or placer gold), this reply does not touch the case. But it is as inadequate as it is inappropriate. It so happens that there are manufacturers who use native gold. We have the names of six establishments in one town, which use nothing else. But they very naturally do not go to mints or assayers for it. One might as well buy raw cotton at a calico-factory. They purchase of miners and merchants. It was not this consumption of native gold, however, to which we alluded, but that of prepared gold. Mr. GARNETT says, if the gold and silversmiths use refined gold, "they go to the mint for it, and it is therefore accounted for by his patent system." Supposing they do get it all at the mint (which is not the case), how is it accounted for by a system which considers only coinage and exports? Far the larger part of the fine bars now made in New York and Philadelphia are neither coined nor exported. Our present exports are mainly unparted bars. But Mr. GARNETT tells us to *deduct* from the deposits the fine bars not coined, and this is what he calls "accounting for them." The estimates of a stage-driver are better than such "statistics."

The Commissioner of Mining Statistics is acting under instructions, which define to some extent both his duties and his "methods." He is directed to visit in person the mining districts, and to furnish statistics under many heads, one of which is "the yield of the mines worked." It is precisely because the process of cooking the mint and export statistics does not give a satisfactory view of our mineral resources, that such an agency is maintained. Both the present Commissioner and his predecessor have repeatedly declared it to be impossible, with the means placed at their disposal, to obtain accurate statistics of production. They have consequently submitted on this point merely brief general estimates, based on the best information they could obtain. We have not yet undertaken to give the authority for Mr. RAYMOND's estimates. What we have undertaken to show is the impotency of the argument based on the GARNETT patent.

That system is as inapplicable to the placers and gulches of Idaho and Montana as it would have been in early days to those of California. The local prejudices of San Francisco may deny the existence of a product of gold which does not come to that city; yet facts are facts, and it is positive, not negative, information which has led the Commissioner to estimate the product of those Territories as he has done. But this point we may take up hereafter. The negative knowledge of Mr. GARNETT and his officious fugleman in the *Alta* is very like ignorance.

One more quotation from his pamphlet will show to what conclusions his system leads him. He argues that every dollar of the precious metals produced in the country costs $1 80 in wages alone, "to say nothing of the immense amounts of capital invested in mining machinery and other incidental expenses," and explains the continuance of the business on the ground that it is a "fascinating pursuit!" Some similar fascination must be the reason of his pursuit of the science of statistics, in which fourteen years of practice have not enabled him to decipher intelligently "tables A, B and C."

To recapitulate. We assert of Mr. GARNETT's method:

I. That it does not accurately obtain the domestic coinage;

II. That it does not accurately obtain the domestic exports;

III. That it does not include

a. Gold and silver furnished by mints and government assay offices to manufacturers, and never coined or exported;

b. Native gold and silver used in manufactures;

c. Gold and silver prepared for jewellers elsewhere than at the mints and government assay offices.

d. Shipments of gold and silver in ores and mattes;

e. Exports of gold and silver bullion in private hands.

f. Gold and silver *in transitu*—that is, produced but not yet deposited for coinage or exported.

g. Gold and silver bullion hoarded in specimens, bars, and otherwise.

We cannot at present discuss these points more fully. Some of them amount to millions, others to hundreds of thousands only; but all of them are valid, tangible, and susceptible of proof, conclusive, though not detailed and exact. Mr. GARNETT is fond of saying the alleged errors of his opponent are "not ingenuous;" if his own are ingenuous, he is the most magnificent spectacle of simple sincerity that ever dazzled an admiring public.

New Publications.

THE UNIVERSITY SERIES: *Educational and Scientific Lectures, Addresses and Essays.*

No. 1. On the Physical Basis of Life. By T. H. HUXLEY, LL. D., F. R. S.

No. 2. The Correlation of Vital and Physical Forces. By PROF. GEORGE F. BARKER, M. D., *Yale College.*

No. 3. As Regards Protoplasm, in Relation to Prof. Huxley's Essay on the Physical Basis of Life. By JAMES HUTCHISON STERLING, F. R. S., *and* LL. D., *Edin.*

No. 4. On the Hypothesis of Evolution, Physical and Metaphysical. By PROF. EDWARD D. COPE.

The series of which these pamphlets constitute the first four numbers is to be indefinitely continued, at the rate of about one number a month, by the publishers, Messrs. CHARLES C. CHATFIELD & Co., New Haven. The pamphlets are of uniform style and price (75 cents each; $1.10 for five successive numbers, in advance; $2 for ten); and will make, when bound together, a fine volume, as they are printed in clear and handsome type on good paper.

Mr. CHATFIELD is a Yale graduate, who has distinguished himself by the establishment and successful management of the *College Courant*, which was in the beginning but a local publication; but has now become, we understand, a sort of organ for all American college news and interests. In the prosecution of this enterprise, Mr. CHATFIELD showed that he knew how to "apprehend the situation"—to see what was needed, and what would be accepted with eagerness. The publication of the University series is another proof of the same intuition. These utterances of different masters concern topics which profoundly interest at the present time the most thoughtful minds. Scarcely a cultivated, reading man in the country will fail to rejoice at hearing that they are to be made accessible to the public in a more convenient form than that of newspaper reports, or essays in scattered periodicals.

The first and third of these pamphlets are able presentations of the two sides of the great "protoplasm" question. Prof. HUXLEY's paper contains nothing absolutely new to the scientific world; but its popular and striking style has made it one of the most celebrated of modern biological essays. There is always something sacrificed when science is made sensational; and this generalization of Prof. HUXLEY appears to be more brilliant than sound. It is the presentation of a view not yet fully accepted by anatomists and embryologists, as though it were the certain and acknowledged result of all inquiry thus far. Prof. STERLING's reply points out this defect with much acuteness; but it is marred by a sneering and controversial tone. That perfect candor and humility which HUXLEY partially sacrifices to make a startling impression, STERLING sacrifices to make a caustic critique; and in this particular both are to be condemned.

Prof. BARKER's *Correlation of Vital and Physical Forces* is, like all the works of this distinguished chemist, clear in statement and "advanced" in standpoint. Perhaps there is here and there a trace too much of that dogmatism which we should prefer to leave to theologians and politicians, and to banish forever from the utterances of science, which, being confessedly tentative and progressive, can have no dogmas.

Prof. COPE, the author of the address on the *Hypothesis of Evolution, Physical and Metaphysical*, though a young man, is already eminent as a palæontologist and comparative anatomist. As a hypothesis modifying and complementing that of DARWIN, and particularly as an attempt to do for the origin of genera what DARWIN does for that of species, "Evolution" is highly plausible and suggestive, though still lacking in that rigid logical progression and that abundant illustration and foundation in facts, which characterize the hypothesis of natural selection. As an attempt to explain the mental and moral development of the human race, and to reconcile the discoveries of science with the Mosaic account of the creation and the fall of man, we find "Evolution," as here set forth, vague, obscure, transcendental and inadequate. Perhaps the trouble is, that we do not quite understand COPE—nor MOSES.

LOCOMOTIVE ENGINEERING AND THE MECHANISM OF RAILWAYS. A treatise on the principles and construction of the Locomotive Engine Railway Carriages, and the railway plant. With examples selected from the International Exhibition of 1862. Illustrated with sixty large engravings and numerous wood-cuts. By ZERAH COLBURN, Esq., Civil Engineer. New York: JOHN WILEY & SON, 15 Astor Place. 1870.

The high reputation which Mr. COLBURN enjoyed for many years, both in this country and in England, and his long and varied experience in engineering matters, rendered him perhaps better adapted than any other man in either country to publish a book upon this subject. His opportunities for getting together the necessary facts and drawings were unsurpassed, and we feel happy to bear testimony to the faithful manner in which the work was performed. The treatise consists of twenty parts, each of which contains sixteen pages of letter-press, and three double-sheet engraved plates. The latter are in the clearest and finest style of English engraving art.

The difference in the manner of building the roads in this country and in England render some portions of the work less valuable to American than they would be to English engineers. Since, however, we are yearly conforming more and more closely to the English model, we shall doubtless find that after a few years the difference between the two systems of road-building, and the consequent difference in the construction of the locomotives, will almost entirely disappear.

In fact, even now many of the more important and better American roads, such as the Pennsylvania Central for example, will compare favorably with the English in respect to the quality and general stability of the permanent way. But it is useless to disguise the fact, that as a whole the railroads of this country have been hurriedly and even superficially built. The average cost per mile is less than that of European roads, while labor and the necessary materials, with the exception of wood for cross-ties, are much higher. The roads must, as a consequence, be less strong and durable, and therefore they require a different class of locomotives; but the nearer we approach the European standard of stability, the more important does a thorough knowledge of the English system become to the American engineer, and the information is not, at least so far as we know, anywhere so clearly, thoroughly and impartially given as in this work.

An American Institute of Mining Engineers.

The great development of the mines and metallurgical works of this country during the last few years, accompanied as it has been with the investment of enormous sums of money in purchasing lands and in the erection of improvements, requires that advantage should be taken of the accumulated knowledge of engineers, superintendents and others, in mastering the problems which are constantly presenting themselves for our action. Among these may be mentioned, the consideration of more economical systems of mining in our coal and metalliferous mines; improved methods of transportation above and below ground; unwatering and ventilating mines; the mechanical preparation of coal and other minerals; the various metallurgical processes; and, in fact, every question tending to the attainment of the two great objects:

1st. The more economical production of the useful minerals and metals.

2d. The greater safety and welfare of those employed in these industries.

In European countries, where the arts of mining and metallurgy have long been the subject of the most careful study, no means have been found so effectual in attaining the end above proposed, as the free interchange of experience among those actually engaged in these industries; and this object has been accomplished mainly through the medium of "Institutes," "Associations," or "Societies," composed of those engaged in these occupations, and by the periodical publication of "essays" or "papers" communicated to such societies by their members.

It must be evident to all practical men that the interchange of the varied experience of those engaged in such occupations in this country, could not fail to advance very materially the desired objects; it is therefore proposed to establish an American Institute of Mining Engineers, which will hold its meetings periodically in the great mining and metallurgical centres, where works of interest, such as mines, machine shops, furnaces and other metallurgical works, can be inspected, and the miners can exchange their views and consult for mutual advantage upon the difficulties encountered by each. These "Transactions" or "Proceedings" would form, when published, a valuable and greatly needed addition to our professional literature. It is proposed that a meeting of those sympathizing with these objects shall be called for the purpose of organizing such an association, the time and place of meeting being Wilkes-Barre, Pennsylvania, and the month, April or May.

Any one who may have devoted himself to a particular subject connected with either mining or metallurgy, and who may be possessed of new facts in reference to it, would greatly aid in furthering the objects of the proposed association by preparing a paper giving the result of his experience, to be communicated at the first meeting. It is expected that the desire for the advancement of professional knowledge, combined with the attractions of a visit to the most beautiful of our coal fields—the Wyoming Valley—will insure a large attendance from all parts of the country.

A circular, nearly identical with the foregoing paragraphs, has been prepared and signed by Messrs. ECKLEY B. COXE, of Jeddo, and R. P. ROTHWELL and MARTIN COBYELL, of Wilkes-Barre, three mining engineers, whose reputation is a guaranty that the proposition they have issued is intended in good faith to promote the interests of their profession, and not, like some others of the kind, to favor the schemes of adventurers, or foist insignificance into notoriety.

We sincerely hope that this movement may be successful. It certainly promises to supply a great want of American engineering. Communications indicating opinions and wishes as to the organization and objects of the "Institute" will be gladly received by any of the gentlemen above mentioned, and a notice of the date of meeting, which will be arranged to suit the greater number, will be duly communicated. Mr. ROTHWELL desires us to say that the invitation extended is general, though of course but a small number, comparatively, will receive circulars, unless by writing for them.

A Few Facts Concerning the Republic of Ecuador.

The Republic of Ecuador contains an area of nearly 50,000 square miles (exclusive of a large tract of land claimed by Brazil and Peru), besides the Galapagos Islands, containing about 25,000 square miles. It is situate in a very beautiful and fertile region, and its climate all that could be desired. The scenery, from the Pacific coast to the snow-clad mountains of Chimborazo, Cayambi, and Antisane, is beautiful beyond description. The country gradually rises from the coast to the mountains to a height of 5,700 metres, and the soil is exceedingly productive. Fruit, vegetables and cereals of the more temperate regions grow here, besides all the productions of the tropics—cocoa, coffee, sugar-cane, pine-apples—in great abundance. India rubber, Peruvian bark, vanilla, and thousands of medicinal drugs are found here; and its timber is equal, if not superior, to any other grown in South America. Its mineral wealth is no less valuable. The declivities of the Andes conceal extensive mines of gold, silver, iron, mercury, lead, zinc, copper, sulphur, and a great variety of salts.

In the Cordilleras and its tributaries have been found pure crystal, rubies, marble silex, etc., and now to all this long list of valuable productions of Ecuador is to be added petroleum, which has been found in very large quantities on the surface of certain parts of the country, mostly in the Canton of Santa Elena. Here the climate is delightful, and it is the resort for invalids, on account of the curative properties of its mineral waters, which bubble spontaneously from its "giant wells."

Strange as it may appear, it is nevertheless true, that not a single American steamer runs regularly to the South Pacific coast, and we depend wholly upon English enterprise for our news from this most important part of South America. It is really surprising that our enterprising merchants have not already turned their attention to the development of the resources of this interesting country, especially when it is known that the Government of Ecuador are offering great inducements to capitalists to do so.

An advertisement in another column describes the petroleum deposits of Ecuador, and shows what the Government is willing to offer in the way of inducements to capital, for working them. The springs, to judge from the description, closely resemble those of Enniskillen in Canada, as they appeared when worked by shallow wells only, and those of Galicia in Europe, which have always been worked in that manner.

Wyoming—Progress in the North-west.

THE following interesting account of the progress of this new and enterprising Territory, is taken from the correspondence of the New York *Evening Post:*

Wyoming is the youngest of the Territories. It was set off from Dakota three years ago, with an area about twice as large as that of the State of New York. The census taken a few months ago showed a white population of but 9,118. Two-thirds of this is confined to the towns and stations of the Union Pacific railroad, which traverses the whole of the northern part of the Territory. The rest is mostly distributed between the Sweetwater mines and the Bear Valley. This growth is surprising, if we consider that the surrounding country is undeveloped and to all appearances barren, and that the choice parts of Wyoming are in the possession of the hostile Sioux and Cheyennes. It is only a few months since the resources of this Territory were ascertained. The towns and settlements thus far built up were either for freighting, trading, military or mining purposes. How a few weeks merely has changed the character of some of the towns, may be readily seen by the traveller passing over the line of the Union Pacific railroad.

Cheyenne has been fittingly called the "Magic City." It had a city government almost as soon as it was surveyed, and a population of ten thousand before its first building was a twelvemonth old During the time that it was the terminus of the Union Pacific, the freight distributed to the Territories and to the Pacific coast reached ten million pounds per month, and during 1868 the cash paid at this post for the transportation of merchandise was $2,164,355. Here was a bustling, money-getting community, and so busy had everybody been that they had not time to build churches and schools. In fact the latter were hardly needed, for there were very few children in town. Men had not brought their families with them. It was the outpost of civilization. There were dangers on every hand. No one cared to make improvements. Cheap wooden buildings, no gardens or trees, no effort at adornment. Everybody was there to gather what he could of the harvest of trade, which would merely for a season or two centre there. The extension of the Union Pacific and the building of the Denver Pacific railroad changed the order of things. The forwarders, freighting teams and fortune-seekers followed on to the next terminus of the railroad. At the beginning of 1870, Cheyenne had a population of scarcely one thousand. The town had been going down, and had about touched bottom. Its citizens had began to build and improve, search out and develop the surrounding country. Brick houses and stores began to appear, also graded streets, schools, churches, gardens, public societies, a board of trade. The place now has signs of permanent growth. A national bank has just been organized—the first in the Territory. Three newspapers are sustained, one of them daily. Two important railroads are projected. Efforts are being made to establish iron manufactories and smelting works. An immigration society is in active operation. A local paper, summing up the results of the past year, says: "To build up three fine churches, to construct a canal for bringing water into the town, to have a board of trade in a flourishing condition, a national bank establishment, and all our citizens taking hold and working together for the benefit of the community, is certainly a step in the right direction—upward and onward."

Laramie is on the railroad, fifty-seven miles west of Cheyenne. It has a population, according to the last census, of 1,478. One will find here surprising thrift for a town of the plains scarcely two years old. Five neat and substantial churches, a public graded school, an institute for the higher classes, a public lyceum, a daily newspaper, a bank, regular streets, pipes bringing clear water from the springs at the base of the Black Hills—all these are marks of a live, intelligent community. The railroad has a round-house at this place, a machine-shop for general repairs, and what speaks well for the humanity of the company, a fine hospital for the accommodation of sick and disabled employés. About three hundred railroad hands make their headquarters in Laramie. We learned from the station agent that the freight forwarded from this station will average about one hundred and fifty thousand pounds per month, and the freight received about three hundred and twenty thousand pounds. The cash receipts are about $200,000 a month. The cattle business of the Laramie plains centres here, and the shipment of fat beeves for the Chicago market here, at times during the winter, reached ten car loads per day. Large quantities of elk, antelope and other game are forwarded from this point to eastern markets.

Evanston, a station on the Union Pacific, has been built up since last summer, and its more rapid and permanent improvement dates back only a few weeks. The machine shop, round-house and eating-houses of the Union Pacific road were moved

from Wasatch to this place recently, and the citizens have taken fresh courage. Handsome streets and large buildings greet the eye ; new houses and stores are going up ; the neighboring lumber-mill is running night and day to supply the demand. The great industry of the town is coal-mining. Here is the best coal in the West, outcropping above the level of the river bottom in veins of pure coal. The principal mines are three miles from the railroad; they are owned by the Union and Central Pacific roads jointly, and a part of each road is supplied from this source. Salt Lake and the northern portions of Utah and Nevada are dependent upon them for fuel. A great deal is shipped to California ; the gas-works of Sacramento and San Francisco, and some of the steamships of the Pacific use it. The mines have now a capacity of five hundred tons per day, and will soon be increased. The miner's camp contains over one hundred families, and the pay-rolls amount to many thousand dollars every month. Not far from the depot, the railroad company are building twenty-five handsome cottages for their workmen. A large trade is likely to centre here. The shortest and best route to Montana is from this point, by way of the Bear River Valley. A mail route is about to be opened this way, and much of the transportation that now leaves Corinne station for Montana will, in time, leave the railroad at Evanston. The cost of shipping will be less and the time shorter. Business houses are going up, a bank is about to be established, and in view of what the town has to build on, the sanguine predict that in less than three years it will contain five thousand inhabitants.

In speaking of Evanston we have touched upon what is becoming a prominent industry in Wyoming—we mean coal-mining ; and as the developments already made have a peculiar interest in the settlement of the New West, we will describe those in operation and speak of the recent discoveries. An analysis of the Evanston coal, which is perhaps the purest found in the Territory, gives the following result :

Carbon	72.16
Ashes	2.50
Sulphur	None.
Water	3.44
Volatile matter	22.00
Total	100.00

The Hallville mine, nearly three hundred miles from Cheyenne, is on Bitter creek, Carter county, Wyoming. It was discovered when grading the Union Pacific. There are two veins, with a stratum of shale between. The upper vein is ten feet, and the lower six feet in thickness. The coal is used principally for domestic purposes, fifteen thousand tons having been sold in Omaha the past year.

The Vandyke mine, forty miles west of Hallville, was discovered in 1864, by an old mountaineer, who sold his claim, in 1869, to the Hallville company, for $25,000. The coal is used mainly for steam and blacksmithing purposes. Eighty thousand tons were sold in Omaha the past year, and the remainder was sent all over the western Territories, for manufacturing purposes.

The Carbon mines, which were recently burned, are on the railroad, one hundred and forty miles west of Cheyenne. The coal is reached by a perpendicular shaft seventy feet in depth. The vein is six to nine feet. Before the explosion it was producing three hundred tons per day, and was supplying the Union Pacific and the Denver division of the Kansas Pacific railroad.

The Rock Spring mine, 315 miles west of Cheyenne, is an eight-foot vein, reached by an open drift in the side of the hill. The product during 1870 was about 2,000 tons per month. During December there were taken out and shipped nearly 2,000 tons.

Explorations lately made show that the coal measures of Wyoming cover a very large area, and many of the best veins have not yet been worked. The lignite deposits of the Laramie plains, in beds from five to eleven feet thick, have been traced ten miles east of Rock creek, a branch of Medicine Bow river, and outcroppings occur along the North Platte, Muddy creek, Bitter creek, Echo cañon, Weber river, and west as far as the borders of Utah. The same deposits have been found eighty miles above Fort Laramie. The whole product of the Wyoming coal mines is now about 20,000 tons per month. The increasing demand for the coal, both for domestic purposes and for manufactures, must increase the product this year to more than double its present amount. The capacity of all the banks on the line of the Union Pacific can be multiplied many fold, and the supply seems inexhaustible. Prof. HAYDEN, United States Geologist, who a few weeks ago completed his examination of the mineral resources of Wyoming, gives it as his opinion that in general heating properties, in freedom from sulphur, and in impressive resistance to atmospheric influence, Evanston coal will compare favorably with any in the market. It will make more steam than the same quantity of anthracite, and is better for gas generation than Pittsburgh coal. It has less waste, showing a smaller proportion of ashes and clinkers. Experiments made in manufactures at Omaha show that it excels Lehigh coal for smelting, as it adds to the grain and toughness of the metal. From tests made in the motive department of the Union Pacific road, it is found that a ton of Wyoming coal will propel an engine seventy-five miles, while the reports of the Pennsylvania Central show that a ton of anthracite will run an engine but forty miles.

In this connection some facts about the iron region of Wyoming will be of interest. About forty miles north-west of Cheyenne there is a mountain of almost pure magnetic iron, that quite dwarfs the famous Pilot Knob region of Missouri. It is a spur of the Black Hills, shooting up near where the cañon of the Chugwater cuts through the crest of the plateau. It is an isolated peak, a mile long by several hundred feet wide, rising almost perpendiculary two thousand feet above the general surface on the west side, and covered with earth and drift on the east. The ore is stratified and entirely free from rock. The blocks are black, crystalline, and break with a fracture almost like cast-iron. The deposits are immense. An enthusiastic explorer of the region says that "there is more pure magnetic iron ore in the Black Hills of Wyoming Territory, above ground, than all the teams of North America can haul away in a life-time." The ore is said to contain seventy-five per cent. of pure iron. Its quality will soon be determined, as a shipment of twenty-five thousand pounds was lately sent to St. Louis to be tested. A local paper, anticipating the result, declares that it will be simply confirmatory of what is already known here, namely, that this iron ore exceeds in its proportion of pure metal any similar deposit of ore any where in the world. The Iron Mountain of Wyoming is destined to become one of the most important and valuable possessions of North America." South of Cheyenne important deposits of brown hematite ore have been found. The proximity of these iron beds to the coal mines, and the adaptability of the latter for purposes of manufacture, are likely to make of Cheyenne and Laramie important manufacturing centres. Each is from twenty-five to thirty-five miles from the Iron mountain, while the latter is almost in the neighborhood of the purest and most extensive coal bank.

The gold-mining interests at Sweetwater have been almost destroyed the past year by Indian raids, and it was not until late in the season that military protection was afforded. The hazards of mining and the difficulty of getting supplies, as well as the increasing attraction of other mining sections, has drawn away much of the interest that centered there. But another season, it is believed, greater progress will be made.

South Pass City, seventy-five miles north of Rock Springs station, on the Union Pacific, is the centre of quite a mining region, with a population of about fifteen hundred. On the bank of Little Wind River, near by, is a ledge of gypsum about thirty feet thick, and rising sixty feet above the level of the stream. In the vicinity are found numerous coal and oil springs. Near Rawlins station are numerous mines of paint ore. Cinnebar and copper are also close at hand. The party composing the surveying expedition running the fourth parallel for the public land survey arrived at Evanston a few days ago. They report silver and gold in the Medicine Bow and Snake river mountains, and coal all the way from Snake river to Bear river.

The Bear river valley is one of the most attractive and fertile in the Rocky Mountain region. It is from five to fifteen miles wide, and ninety miles long from Evanston to Soda Springs. About forty miles down the river is Bear lake, a splendid body of water, thirty miles long by ten broad. Around this lake are no less than thirteen towns, grown up within the past year almost, and ranging in population from fifty to five hundred inhabitants. Among the largest are Burlington, Montpelier, St. Charles and Paris. Here we find thriving, energetic little communities, saw-mills, grist-mills, flouring-mills and factories. The surrounding ranches and stock-farms supply ample food for the population, and they are beginning to export considerable. This is the best part of Wyoming now open to civilization, and it is rapidly growing. We noticed on the river above some millions of feet of logs ready to run down to the mills in the spring. They were larger and better for lumber than any we have seen in the territory, and the Uinta mountains are full of excellent timber to meet the demands of the increasing population between Cheyenne and Salt Lake for years. Such great resources cannot be long ignored. There is reason to believe that the Union Pacific will give all facilities to the development of this business, and even within the present year it is likely that Evanston and the borders of Green river will be important lumber manufactures.

The Cheyenne, Iron Mountain and Montana railroad has broken ground, and the company hope to secure a grant of land and interest capital sufficient to build to Fort Fetterman, one hundred and fifty miles, during the present year. The engineers will locate the whole line in the spring. The route that seems most feasible is up the valley of the Crow creek to the base of the Black hills, thence to the Chug valley to its junction with the Big Laramie ; thence across the plains to the valley of the North Platte, and up that stream to the Red Buttes. From that point there is an easy route across the divide to the eastern base of the Big Horn and Wind river mountains, following the old Bozeman route from the North Platte to the Gallatin, and thence to Helena. The completion of such a road would furnish a fine outlet for the trade of Montana via Cheyenne, Denver and the Kansas Pacific railroad to St. Louis. But the prime benefit to Wyoming is the development of resources which must place it in the front rank of the territories. Starting from Cheyenne it would strike first the Iron Mountain. Should this prove what it promises to be, then manufacturing towns must spring up at its base, or the whole product flow down to Cheyenne, where, meeting the coal from the west, furnaces, foundries, factories, rail mills, and the whole range of manufacturing industries must spring up. At the sources of the Bitter Cottonwood, Horseshoe and La Bonte creeks, north of Laramie Peak, are large bodies of excellent timber, which this railroad would reach. The soil along most of the route from Cheyenne to Fort Fetterman is excellent, and, when irrigated, produces crops equal to the premium yields of Colorado. Along the eastern base of Big Horn mountains is a broad belt of country, esteemed by the Crow Indians as the garden spot of the earth. The climate is mild, and the crops certain and bountiful. The mountains above, and the whole Wind river region near at hand, contain exhaustless mines of coal, iron, asphaltum, oil and gypsum. And further on, along Clark's Ford of the Yellowstone, we strike the newly discovered placer mines of Northern Wyoming, rivalling in promise those of the Sweetwater region. No railroad enterprise as yet inaugurated in the territories is likely to develop such splendid resources. But it is probable that the project, as far as the building from Fort Fetterman to Helena is concerned, will "hang fire" for many months. The want of capital and the hostility of the Indians are the great obstacles in the way. Should the Government place the latter on a reservation, or give increased military protection to Northern Wyoming, the prime difficulty would be removed.

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111,294, antedated January 21, 1871.—CAR-STARTER.—Finley J. Wright and Livingston W. Wandell, New York, N. Y.

111,295.—PAINT FOR SHIPS' BOTTOMS.—Isaac J. Wyman, New York, N. Y.

111,296.—ADJUSTABLE REAMER.—Edwin H. Adgate, Mittinegue, Mass.

111,297, antedated January 21, 1871.—FASTENING FOR DOOR-KNOB ROSES.—James M. Adolphus, Philadelphia, Pa.

111,298.—STEAM-GENERATOR.—Christopher Ahrens and Frank Kamman Cincinnati, Ohio.

111,299.—MACHINE FOR WELDING TUBES.—William C. Allison, Philadelphia, Pa., assignor to W. C. Allison & Sons, same place.

111,300.—WELL-AUGER.—Elijah Altman, Hamilton, Mo.

111,301.—FODDER-STAND.—John Antram and Elwood B. Mullin, Franklin, Ohio.

111,302.—MILK-CAN.—Thomas M. Bell, New York, N. Y.

111,303.—PNEUMATIC SPRING.—John Bevan, Port Richmond, and Benjamin W. Hitchcock, West Flushing, N. Y.

111,304.—PRINTING-PRESS GUIDE.—Alexander L. Beyans, Flushing, N. Y.

111,305.—MANUFACTURE OF COPPERAS.—R. De Witt Birch, Philadelphia, Pa.

111,306.—APPARATUS FOR OPENING THE EYES OF PICKS.—Robert Blake, Scranton, Pa.

111,307.—METALLIC ROOFING.—George W. Bliss, Springfield, Mass.

111,308.—HORSE HAY-RAKE.—Olpha Bonney, Jr., San Francisco, Cal.

111,309.—HAT-SUPPORTER AND VENTILATOR COMBINED.—John A. A. Bothwick, Philadelphia, Pa., assignor to himself and George W. Hess, same place.

111,310.—BEE-HIVE.—Arthur Bradshaw, Rantoul, Ill.

111,311.—HEAD-STOCK FOR MILLING-MACHINES.—Amos H. Brainard, Hyde Park, Mass

111,312.—WHEEL FOR VEHICLES.—Alexander D. Brown, Sr., Columbus, Ga.

111,313.—WASHING-MACHINE.—Edmund P. Brown, Thomasville, Ga

111,314.—HAY-TEDDER.—Ezekiel W. Bullard, Barre, Mass.

111,315.—CRACKER-MACHINE.—William Cairns, Jersey City, N. J.

111,316.—PUMP.—Herman Camp, Rouseville, Pa.

111,317.—CULINARY VESSEL.—John H. Chappel, New York, N. Y., assignor to himself and Robert Seaman, same place.

111,318.—COMPOUND FOR ENAMELING BRICKS.—Decius W. Clark, Chicago, Ill.

111,319.—CORN-POPPER.—William F. Collier, Worcester, Mass.

111,320.—HORSE HAY-RAKE.—Isaac N. Condra, Genoa, Iowa.

111,321.—BATH AND WASH-STAND.—Royal Cooper, Georgetown, D. C.

111,322.—GATE.—Hosea Ballou Crandall, Brocton, N. Y.

111,323.—GRAIN, COFFEE, AND RICE-CLEANER.—Andrew Crawford, Wilkesbarre, Pa., and Iram D. Crawford, Bloomington, Ill.

111,324.—HARNESS-OPERATING MECHANISM FOR LOOMS.—George Crompton, Worcester, Mass.

111,325.—CARPET.—George Crompton, Worcester, Mass.

111,326.—PLATFORM HORSE-POWER.—Frank J. Culver, Hartford, Vt.

111,327.—SCREW-DRIVER.—Moses W. Dillingham, Amsterdam, N. Y.

111,328.—SCROLL-SAW.—William H. Dobson, Rochester, N. Y., assignor to Henry Lampert, same place.

111,329.—COMPOUND LIQUID FOR USE IN VAPOR ENGINES.—Joel A. H. Ellis, Springfield, Vt.

111,330.—STUFFING-BOX FOR ENGINES.—Joel A. H. Ellis, Springfield, Vt.

111,331.—VAPOR GENERATOR FOR VAPOR ENGINES.—John A. H. Ellis, Springfield, Vt

111,332.—FLY-CATCHER.—Harriet A. Farnam, South Bend, Ind.

111,333, antedated January 29, 1871.—MACHINE FOR SPLITTING WOOD.—Frank Ficht, Dyckeville, Wis.

111,334.—STEM-WINDING WATCH.—Walter H. Fitz Gerald, Carlstadt, N. J., assignor to Spadone & Fitz Gerald, New York City.

111,335.—PAPER FILE.—John G. Floyd, Jr., New York, N. Y.

111,336.—DAMPER.—James M. Frear, Pittstown, Pa.

111,337.—CARPET-STRETCHER.—Charles E. Gale, Aurelius, N. Y.

111,338.—ROAD-SCRAPER.—George B. Garlinghouse, North Madison, Ind.

111,339.—SASH-HOLDER.—Philetus W. Gates, Chicago, Ill., assignor to himself and D. R. Fraser, same place.

111,340.—RAILWAY CAR TRUCK.—Charles Graham, Kingston, Pa.

111,341.—VALVE FOR STEAM PUMPS.—Joseph F. Hamilton, Alliance, Ohio.

111,342.—DOOR-HANGER AND RAIL.—Thomas Foster Hamilton, Geneseo, Ill.

111,343.—LOOM.—Emory B. Hastings, Palmer, Mass., assignor to himself, Edwin Sawyer, Daniel L. Thompson, and Charles A. Perley.

111,344, antedated January 28, 1871.—HARVESTER-RAKE.—George W. Hines, Brookfield, Wis.

111,345.—REGISTERING TICKET-PUNCH.—Austin D. Hoffman, Chicago, Ill., assignor to James H. Small, Buffalo, N. Y.

111,346.—COTTON-CHOPPER.—Joseph R. Hood, Weedowee, Ala.

111,347.—GRAIN-SEPARATOR FOR THRASHING-MACHINES.—James W. Huntoon, St. Louis, Mo.

111,348.—ELECTRO-MOTORS FOR CARS.—Solomon Jones, New Orleans, La.

111,349.—PUMP.—Truman O. Jones, Galesburg, Ill.

111,350.—CORN-SHELLING AND CLEANING MACHINE.—Louis Kamp, Vanderburg County, Ind.

111,351.—BUNG-EXTRACTOR.—Josiah Kirby, Cincinnati, Ohio.

111,352.—BUNG.—Josiah Kirby, Cincinnati, Ohio.

111,353.—CAR-STARTER.—George Byron Kirkham, New York, N. Y.

111,354.—PUMP.—Thomas J. Lapsley, Nashville, Tenn.
111,355.—CARPET-CLEANER.—Hermann Henry Lindhorst, St. Louis, Mo.
111,356.—HOISTING APPARATUS.—Andrew B. Lipsey, New York, N. Y.
111,357.—FERTILIZING COMPOUND.—Joseph M. Lowenstein, New Orleans, La.
111,358.—DISINFECTING AND VENTILATING BURIAL VAULTS.—Benjamin E. Lyford, San Francisco, Cali
111,359.—SEWING-MACHINE.—William A. Mack, Norwalk, Ohio.
111,360.—LAMP.—Charles D. Macqueen, Philadelphia, Pa.
111,361.—HOISTING-FORK.—Elias Magruder, Cap Au Gris, Mo.
111,362.—SPRING BED-BOTTOM.—Erwin William Maxson, Scranton, Pa.
111,363.—COVER FOR BINS.—Alonzo S. Maxwell, Dixon, Ill.
111,364.—BEDSTEAD AND SPRING BED-BOTTOM.—William McArthur, Philadelphia, Pa.
111,365.—COMBINED ROCKING SOFA AND BEDSTEAD.—William Mcarthur, Philadelphia, Pa.
111,366.—SULEY-PLOW.—Edward Meloy and Abram R. Stanley Saulsburg, Wis.
111,367, antedated January 23, 1871.—THRASHING-MACHINE.—Joseph H. Miller, Arcadia, N. C
111,368.—LAMP-CHIMNEY AND DISH-WASHER.—Charles S. Moore and Silas A. Moore, Worcester, Mass.; Silas A. Moore assigns his right to Harland Byd, same place.
111,369.—CULINARY VESSEL.—Francis Morandi, Malden, Mass.
111,370.—MANUFACTURE OF SUPERPHOSPHATE OF LIME.—Campbell Morfit, Sudbrook Park England.
111,371.—FOLDING SETTEE.—Henry T. Morse, Athol, Mass., assignor to L. Morse & Son, same place.
111,372.—SEEDER AND CULTIVATOR.—James T. Mott, Postville, Iowa.
111,373.—VALVE.—George Murray, Jr., Cambridgeport, Mass., assignor to himself, George Murray, Sr., and Henry E. Snow, same place.
111,374.—WASHING-MACHINE.—Andrew Jackson Nave, Columbus, Texas.
111,375.—FANNING-MILL.—Harrison Ogborn, Richmond, Ind., assignor to Samuel T. Baker, Osceola, Iowa.
111,376.—PRESERVING-COMPOUND FOR THE HANDS, &c.—John W. Osborne, Brooklyn, N. Y.
111,377.—SHOT-CARTRIDGE.—Seth White Paine, Williamsport, Pa.
111,378.—LOOM-PICKER.—Jerome M. Parker, Leicester, Mass.
111,379.—SHINGLE-MACHINE.—Willis Porter, Orono, Me.
111,380.—INVALID BEDSTEAD.—William O. Reid, Vienna, N. C.
111,381.—WATER-WHEEL.—Jacob B. Reyman, Springfield, Mo., assignor of one-half his right to Donald W. Campbell, same place.
111,382.—BALANCE SLIDE VALVE FOR STEAM ENGINES.—George W. Richardson, Troy, N. Y.
111,383.—MICA FRAME FOR STOVES.—George G. Richmond, Peekskill, N. Y.
111,384.—PORTABLE SHELF AND SUPPORT.—Parley D. Root, Weston, N. Y.
111,385.—POSTAGE STAMP HOLDER.—Julius Ropes, Ishpenning, Mich.
111,386.—HAND STAMP.—Gottlieb Rost, Union Hill, N. J., assignor to himself, William Austin, Jr., and John Hungermann, New York City.
111,387.—WATER GRATE.—Joseph Ryan, St. Louis, Mo.
111,388, antedated January 21, 1871.—ROLL FOR HAIR-DRESSING.—Elias Schnautz, New York, N. Y.
111,389.—BASE-BURNING STOVE.—John Q. C. Searle, New Albany, Kansas.
111,390.—HEATER FOR PAPER-RULING MACHINES.—Louis Siebert and John Wilson Lilley, Columbus, Ohio, assignors to John P. Hool & Son, New York City.
111,391, antedated January 14, 1871.—CULTIVATOR PLOW.—Joseph Singer, Mendota, Ill.
111,392.—REGISTERING TICKET-PUNCH.—James H. Small, Buffalo, N. Y.
111,393.—BURIAL-CASKET.—Edward T. Smith and Joseph S. Winston, New York, N. Y., assignors to themselves and C. H. Gwyer, same place.
111,394.—ELECTRO-MAGNETIC INDICATOR.—Wesley D. Smith, Washington, D. C.
111,395.—COMPOSITION FOR FLOORS, PAVEMENTS, &c.—Antonio Solari, Louisville, Ky., assignor of one-half his right to Francis Maguet, same place.
111,396.—BENCH-VISE FOR WOOD-WORK.—Edwin Sprague, Allegheny, assignor to himself and John R. Blakeslee, Birmingham, Pa.
111,397.—BARK MILL.—Frederick Stamm, East Lampeter, Pa.
111,398.—BOAT-DETACHING APPARATUS.—George Stancliff, New York, N. Y.
111,399.—HOLDER FOR PLATES WHILE BEING WARMED.—William Stutenborough, Brooklyn, N. Y.
111,400.—LAMP-BURNER.—Freeman Augustus Taber, New Bedford, assignor to Thomas S. Williams, Newton, and Philip S. Page, Malden, Mass.
111,401.—LUBRICATOR.—John Tenwick, Grantham, assignor to Robert Charles Ransome, Ipswich, England.
111,402.—BED-BOTTOM.—Edwin C. Thompson, New York, assignor to himself and Charles L. O'Brien, of Ithaca, N. Y.
111,403.—CLEANING AND POLISHING COFFEE.—William Thompson, New York, N. Y., and Samuel Thompson, Baltimore, Md.
111,404, antedated January 21, 1871.—DIGGING-MACHINE.—Isaac P. Tice, New York, N. Y.
111,405.—CURTAIN FIXTURE.—Richard Vose, New York, N. Y.
111,406.—COMBINED COFFEE MILL AND APPLE PARER.—Dewitt C. Warner, Chicago, Ill
111,407.—PRINTING-PRESS.—Richard C. Warwick, New York, N. Y.
111,408.—TELEGRAPHIC PROTECTION FOR SAFES, VAULTS, AND BUILDINGS.—William B. Watkins, Jersey City, N. J.
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111,411.—FIRE ALARM TELEGRAPH.—William B. Watkins, Jersey City, N. J.
111,412.—FIRE ALARM TELEGRAPH.—William B. Watkins, Jersey City, N. J.
111,413.—FIRE ALARM TELEGRAPH.—William B. Watkins, Jersey City, N. J.
111,414.—STAVE-SAWING MACHINE.—Charles Thompson Watson, Deerfield Mich.
111,415.—MACHINE FOR DISINTEGRATING WOOD.—Charles Wolff, Sr., and Charles Wolff, Jr., Cincinnati, Ohio.
111,416.—CORN AND PHOSPHATE DRILL.—John W. Wood, New Leeds Corner, and Gabriel Moore, Fair View School House, Md.
111,417.—BOX-OPERATING MECHANISM FOR LOOMS.—Horace Wyman, Worcester, Mass.
111,418.—TREE-HOLDER.—Thomas Arnold, Petroleum Centre, Pa
111,419.—CAR-COUPLING.—David H. Ball, Sinnamahoning, Pa.
111,420.—ENVELOPE MACHINE.—James Ball, New York, N. Y.
111,421.—GRAIN-DRILL.—Turner Barnes and Hugh S. Jamison, Greensburg Ind.
111,422.—PIPE WRENCH.—Oramel Graves Barrett, Boston Highlands, Mass
111,423.—PAPER-CUTTING MACHINE.—George Bates, Philadelphia, Pa.
111,424.—HARVESTER.—Lindley M. Batty, Canton, Ohio.
111,425.—WOOD PAVEMENT.—Henry M. Beidler, Philadelphia, Pa.
111,426, antedated January 21, 1871.—STALL FOR HORSES.—Samuel S Bent, Port Chester, N. Y.
111,427.—COOKING STOVE.—Samuel Blue, Danville, Pa.
111,428.—COMBINED GANG AND SUBSOIL PLOW.—Joel L. Bond, St. Louis, Mo.
111,429.—MODE OF FORMING AIR-CHAMBER IN DENTAL PLATES.—Mary Ann Boughton, Norwalk, Conn.
111,430.—CUP FOR KEROSENE LAMPS.—Nathaniel L. Bradley, Meriden, Conn. assignor to Bradley & Hubbard, same place.
111,431.—GRAIN-THRASHER AND CLEANER.—William H. Butterworth and John Butterworth, Jr., Trenton, N. J.; said John Butterworth, Jr., assignor to said William H. Butterworth.
111,432.—CULTIVATOR.—Jarvis Case, La Fayette, Ind.
111,433.—HOT AIR DISTRIBUTING PIPE.—Horace C. Crehore, Boston, Mass., assignor to himself and Samuel T. Cushing, same place.
111,434.—BEE HIVE.—Samuel Cuplin, Iowa Falls, Iowa.
111,435.—INKSTAND.—Samuel Darling, Providence, R. I.
111,436.—BRANDING STAMP.—Armistead M. Darrell, Washington, D. C., assignor to himself, Solon C. Kemon, and Lysander Hill, same place.
111,437.—POTATO-DIGGER.—James Davis, Saratoga, N. Y.
111,438.—COMBINED PNEUMALIC AND RUBBER SPRING.—Patrick S. Delvin, Jersey City, N. J., assignor to himself, Isaac P. Wendell, and Stephen P. M. Tasker, Philadelphia, Pa.
111,439.—SEAL FOR DIP PIPE IN GAS WORKS.—Grafton Douty, Columbus, Ohio.
111,440.—SEAL FOR DIP PIPE IN GAS WORKS.—Grafton Douty, Columbus, Ohio.
111,441.—LUBRICATING COMPOUND.—Elisha Dyer, Jr., Providence, R. I.
111,442.—TUBE CUTTER.—Daniel E. Eaton, Boston, assignor to to himself and James S. Hanscom, Cambridge, Mass.
111,443.—COMPOUND FOR DRESSING AND COLORING THE HAIR.—John N. Fallis, Newport, Ky., assignor to himself and Charles Thacker, Sr., same place.
111,444.—TREATING COTTON SEED OIL TO RENDER IT DRYING.—Rasselas Farley, Cincinnati, Ohio.
111,445.—HARROW.—August Friedemann, Waverly, Ohio.
111,446.—TEMPERING STEEV.—George B. Garman, Washington Township, Ind.
111,447.—SEWING-MACHINE.—Thomas Garrick, Providence, R. I.
111,438.—BOOT AND SHOE SOLE.—Benjamin D. Godfrey, Milford, assignor to William Claflin, trustee of the American Wire-Quilted Sole Association, Boston, Mass.
111,449.—MANUFACTURE OF RUBBER ROLLS.—John Greacen, Jr., and Edward L. Perry, New York, N. Y., assignor to Combination Rubber Company, same place.
111,450.—CARTRIDGE-BELT.—William B. Hayden, Columbus, Ohio.
111,451.—BEE-HINE.—John H. Hendrick, Clinton, Ill.
111,452.—FEEDING MECHANISM FOR SEWING-MACHINES.—Walter B. Higgins, San Francisco, Cal.
111,453.—UMBRELLA.—Mason Hirsh and Leopold Hirse, Philadelphia, Pa.
111,454.—MANTFACTURE OF SOAP.—James Hoagland and Isaac C. McDonald, Columbus, Ohio.
111,455.—FOLDING-CHAIR.—Francis M. Holmes, Boston, Mass.
111,456.—FASTENING FOR EPAULETTES.—William Julius Horstmann, Philadelphia, Pa.
111,457.—MACHINE FOR CUTTING STAVES.—Amyntas J. Howell and James Murphy, Spruce Hill, Pa.
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111,463.—BOX.—Henry Manneck, New York, N. Y.
111,464.—MANUFACTURE OF BROOMS.—Ezra P. Marble, Sutton Centre, Mass.
111,465.—CARPET-LINING.—John C. Mayall, Boston, Mass.
111,466.—BEE-HIVE.—John Armstrong McAnulty, Gilpin, Pa.
111,467.—FRUIT-DRIER.—John V. R. Miller, Richmond, Ind.
111,468.—SLIDING-DOOR.—John More, New York, N. Y.
111,469.—COMBINED BAND-CUTTER AND FEEDER FOR THRASHING-MACHINES.—Samuel S. Myers and James McAuley, McAllisterville, Pa.
111,470.—MACHINE FOR MOLDING KNOBS.—Charles H. Palmer, Brooklyn, E. D., N. Y.
111,471.—VAPOR-BURNER.—Robert W. Park, Philadelphia, Pa.
111,472.—BORING AND MORTISING MACHINE.—Jacob Peters, Lebanon, Pa., assignor to Simon J. Stine, same place.
111,473.—TRACE-CARRIER.—Robert Porter, Ottumwa, Iowa.
111,474.—MACHINE FOR DRILLING AND TAPPING WATER AND GAS MAINS.—James Riley and Patrick Riley, New York.
111,475.—FLUTING-TONGS.—Jacob C. Robie, Binghamton, N. Y.
111,476.—APPARATUS FOR PRESERVING MILK.—Even Ronning, Brodhead, Wis.
111,477.—STREET-SWEEPING MACHINE.—Edward A. G. Roulstone, Boston, Mass.
111,478.—METHOD OF FLANGING BOILER-HEADS.—William B. Scaife, Pittsburg, Pa.
111,479.—JOURNAL-BOX.—John Schieder, New York, N. Y.
111,480.—CONCRETE BLOCKS FOR PAVING.—John J. Schillinger, New York, N. Y.
111,481.—LAMP.—Hermann Alexander Schottky, Stapleton, and Theodore Simendinger, New York N. Y.
111,482.—HARVESTER.—Jacobs W. Schuckers, Philadelphia, Pa., assignor to Isaac A. Shepherd, same place.
111,483.—HARVESTER-REEL AND RAKE.—William H. Seymour, Brockport, N. Y.

REISSUES.

4,241.—RAILROAD CAR SEAT AND COUCH.—Theodore T. Woodruff, Philadelphia, Pa.—Patent No. 16,159, dated December 2, 1856; reissue No. 1,439, dated March 17, 1863; extended seven years.
4,242.—REFRIGERATOR.—Joseph Hyde Fisher, Chicago, Ill.—Patent No. 49,098, dated August 1, 1865.
4,243.—RUBBER-ROLL FOR CLOTHES-WRINGERS.—James B. Forsyth, Boston Mass.—Patent No. 59,798, dated Nogember 20, 1866.
4,244.—MANUFACTURE OF INDIA RUBER ROLLERS.—James B. Forsyth, Boston, Mass.—Patent No. 59,580, dated November 13, 1866; reissue No. 2,589, dated May 7, 1867.
4,245.—THRASHING-MACHINE.—Hugh Hanna, Pittsburg, Pa.—Patent No 84 546, dated December 1, 1868.
4,246.—REGISTERING TICKET PUNCH.—Austin D. Hoffmann, Chicago Ill., assignor, by mesne assignments, to James H. Small, Buffalo, N. Y.—Patent No. 100,036, dated February 22, 1870.
4,247.—Division A.—CENTRIFUGAK SUGAR-DRAINING MACHINE.—Hugh W. Rafferty and Robert Lafferty, Gloucester City, N. J.—Patent No. 88,185, dated March 23, 1869.
4,248.—Division B.—CENTRIFUGAL SUGAR-DRAINING MACHINE.—Hugh W. Lafferty and Robert Lafferty, Gloucester City, N. J.—Patent No. 88,185, dated March 23, 1869.
4,249.—SHAWL.—Martin Landenberger, Philadelphia, Pa.—Design No. 4 233, dated July 19, 1870.
4,250.—SLIDING STOP-VALVE.—Henry G. Ludlow, 2d, Troy, N. Y., assignor to Ludlow Valve Manufacturing Company, same place.—Patent No. 33,309, dated September 17, 1861.
4,251.—HARVESTER.—Henry Watermann, Williamsburg, N. Y.—Patent No. 13,512, dated August 28, 1855; extended seven years.

DESIGNS.

4,613.—DESSERT SET.—Charles Casper, Meriden, Conn., assignor to the Meriden Silver Plate Company, same place.
4,614.—DESSERT SET.—Charles Casper, Meriden, Conn., assignor to the Meriden Silver Plate Company, same place.
4,615.—PLOW CLEVIS.—John M. Cook, Marion, Ind.
4,616.—SEWING-MACHINE SAMPLE TRUNK.—Frederick S. Fahnestock, Chicago, Ill.
4,617.—CORSET.—David H. Fanning, Worcester, Mass.
4,618.—CASTER-BOTTLE.—Joshua B. Graves, New York, N. Y.
4,619.—BOTTLE-STAND.—Cyrus H. Latham and George D. Dudley, Lowell, Mass., assignors to Wood, Sherwood & Latham, same place.
4,620.—SODA FOUNTAIN.—George F. Ecacham, Newton, assignor to James W. Tuits, Medford, Mass.
4,621.—SUSPENDER-LINK.—Edwin Oldfield, Norwich, Conn.
4,622.—THREAD AND NEEDLE-CASE.—Theodore R. Timby, Saratoga, N. Y.

TRADE-MARKS.

146.—MOLASSES GATE.—George S. Lincoln & Co., Hartford, Conn.
147.—MEN'S CLOTHING.—Edward T. Steel & Co., Philadelphia, Pa.

EXTENSIONS.

JAMES P. CRAMER, of Schuylerville, N. Y.—Letters Patent No. 16 364, dated January 6, 1857.
IRA GILL, of Walpole, Mass.—Letters Patent No. 16,426, dated dated January 13, 1857.
JOHN G. VAUGHAN, of Middleborough, Mass.—Letters Patent No. 16,425, dated January 13, 1857.

BUSINESS AND PERSONAL.

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SECTION I.—*Notes on California:*
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II.—The Mother Lode of California.
III.—The quartz and placer mines of Nevada County.
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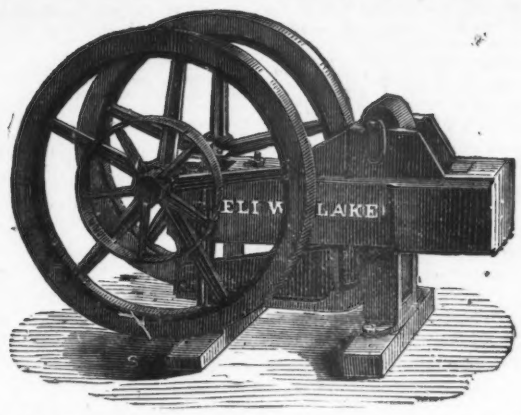

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65	Set of 29 Drills, straight shank, mounted, No. 9	12 00	18	60
66	Set of 60 Drills, at el wire gauge from 1 to 60, No. 12	8 00	15	45
67	Set of 21 Taper-Shank Drills, No. 3	44 00	58	175
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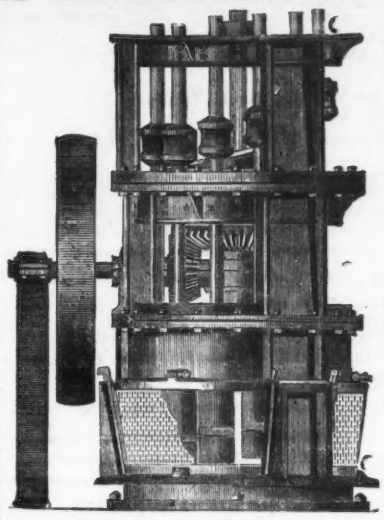

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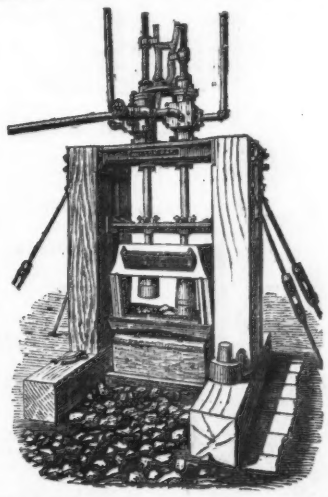

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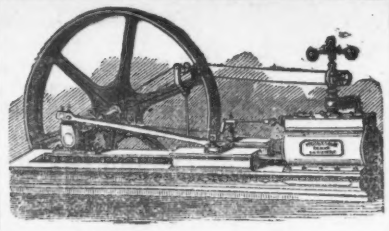

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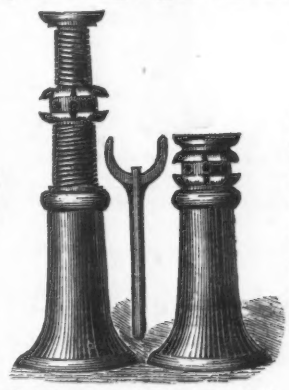

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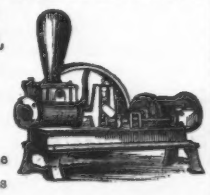

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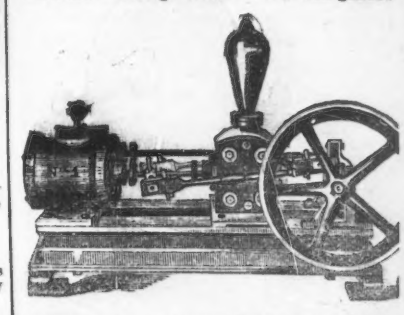

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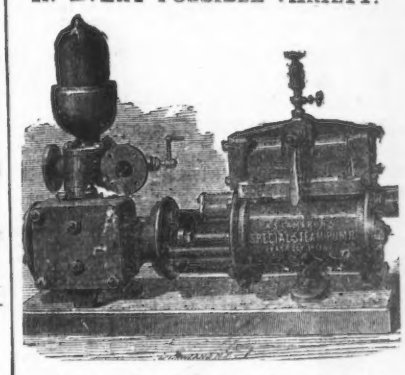

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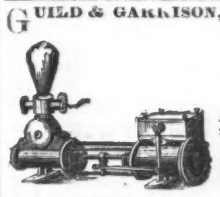

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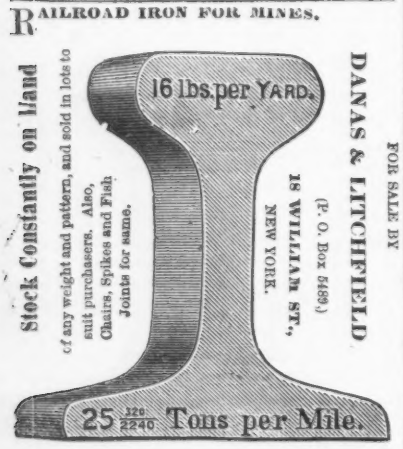
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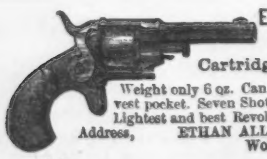

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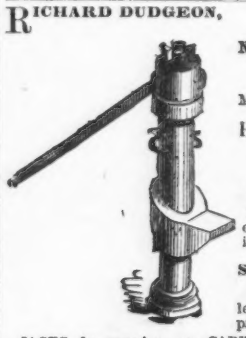

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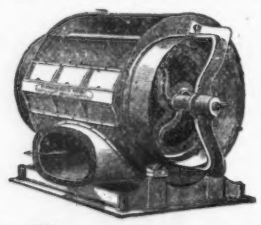

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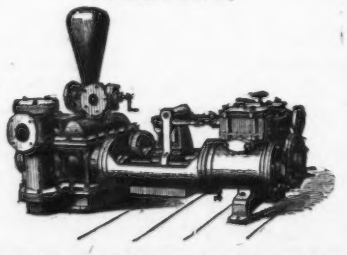

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